Biological Summer Schools

THE BIOLOGIST

A Quarterly Journal Promoting Research Interest in the Biological Sciences

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Publishing Articles
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OBJECTIVE: THE BIOLOGIST desires to publish comparatively short contributions to the progress of the biological sciences, either as beginning research, progress reports or side line discoveries arising out of, or tangential to, completed or nearly completed research problems.

CONTRIBUTIONS: Articles submitted must represent some definite if only minor contribution to the biological field. Purely historical, biographical or historical articles by students will not be considered.

ADVISORY: The opinions of research specialists may be sought by the Editor as to the advisability of publishing any article submitted.

LENGTH: Articles must be as short as consistent with adequate treatment of the research reported. Extensive recapitulation of previous work on the problem should be eliminated.

ABSTRACTS: A brief summary of not more than fifty words must be separately presented with original copy for forwarding to *Biological Abstracts* as soon as the date of publication is determined. Summaries should follow the format used in *Biological Abstracts.*

ILLUSTRATIONS: Sharp photographs or clear line drawings *in ink,* NOT PENCIL, may be submitted. Lengths of articles should be curtailed in proportion to the extent of illustrations used. Cuts used will be paid for by the contributor at standard engraver's rates and become *his* property immediately after publication.

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THE BIOLOGIST

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CALIFORNIA

HOPKINS MARINE STATION

Sixty years have now passed in the life of the first marine station on the Pacific Coast, and the third oldest in the United States. Only Woods Hole (1888) and Cold Spring Harbor (1890) are older. The Hopkins Marine Station dates to the first year of Stanford University.

Its inclusion in the plans of this new University of great promise was inspired by the example of Anton Dohrn's Naples laboratory, and of the Penikese School of Louis Agassiz, which David Starr Jordan had attended.

After a careful examination of various sites along the coast, Pacific Grove, upon the southern side of Monterey Bay, was selected as combining the most desirable features. Through the generous co-operation of Mr. Timothy Hopkins and the Pacific Improvement Company a suitable site and a sum of money sufficient to erect the first building were donated. A plain two-story frame structure, twenty-five by sixty feet in ground dimensions, was erected on Point Aulon, a low rocky headland, and the first session of the new laboratory was held during the summer of 1892. In recognition of the active interest and generosity of Mr. Hopkins, the Station was named the Hopkins Seaside Laboratory. Funds for the purchase of books and equipment were furnished by Mr. Hopkins from time to time, and in 1893 he erected a second building to provide more adequately for the needs of the growing institution.

In recognition of the aid rendered by Mr. Hopkins during the whole life of the laboratory, the Board of Trustees of the University changed the name, October 26, 1917, to the Hopkins Marine Station of Stanford University.

Mr. Timothy Hopkins died on January 1, 1936, leaving his estate (of about one million dollars) in trust, with 60 percent of its income designated "for the maintenance and development of the Hopkins Marine Station, including its library and the support of research work therein." Upon the death of Mrs. Hopkins in 1941, income from the Hopkins Trust became available to the Station.

With the passing years it became increasingly evident that the site upon Point Aulon was inadequate. In 1916 an exchange was effected with the Pacific Improvement Company through which a new location was secured nearly five acres in extent and consisting of the main portion of Cabrillo Point, situated a half mile eastward of the old site. Two and one-half acres were added by purchase in 1921, and about three and one-half acres in 1923. The new situation insures complete control of the coast line of the point, including a sheltered landing place for boats, and provides room for future expansion. Upon this site the first building of the new Station was erected during 1917. It is of reinforced concrete, forty feet by eighty-three feet, and three stories high. The ground floor provides an aquarium room, a concrete-floored room for the storage of cars and apparatus and for the sorting of collections, a small museum room, a storeroom, furnace room, and three small research rooms. There is a deep freeze box for the storage of specimens, and two thermostated tanks for the rearing of embryos and similar purposes.

The second floor, into which the main entrance opens, comprises three large general laboratories and two private laboratories for instructors. The third floor contains a lecture room, an adjoining storeroom, an advanced laboratory, and seven private laboratories for investigators. Fresh and salt water are provided.

The second unit of the present Station, the gift of the Rockefeller Foundation, was completed in July, 1928. Its name commemorates the brilliant career of Jacques Loeb in experimental biology and general physiology. Loeb's classic experiments on the artificial parthenogenesis of sea-urchin eggs were performed near the site of the present Station.

This building is designed for research in experimental biology. It is of reinforced concrete construction and consists of a two-story central portion, with two flanking wings of one story, enclosing three sides of a front court, the over-all dimensions being ninety-five by one hundred fifty-two feet.

The eastern half of the first floor consists of a general laboratory, two advanced laboratories, five private rooms, two storerooms, and an office. The western half comprises a chemistry laboratory, two other large rooms for microbiology, a balance room, a sterilizing and medium room, two small, dark laboratories, a photographic darkroom, and several private rooms. The principal laboratories and workrooms are supplied with sea water, hot and cold fresh water, gas, alternating and direct current, compressed air, and vacuum outlets. Heating is by steam. The second story consists of a stack room, a reading room, a storeroom, and offices.

There are two constant-temperature rooms, one being refrigerated, and a series of thermostated incubators for culturing bacteria or other organisms.

Among the special instruments available may be mentioned: lyophilizing apparatus, colorimeters, Beckman and Coleman spectrophotometers, various centrifuges, polarimeter, refractometers, polarizing microscope, monochromator, Geiger counter, "Micromax" recorder, glass electrode *p*H meters, cathoderay oscillograph, string galvanometer, audio-frequency oscillator, Wheatstone bridge, potentiometers, micromanipulator, and several Warburg manometer shakers and baths. This is in addition to the customary stocks of microscopes, glassware, chemicals, balances, etc.

Sea water, taken from a natural upwelling of pure water at the extreme western end of Cabrillo Point by a set of two pumps, is conducted through antimony-free lead pipes to a reservoir of 10,000 gallons capacity, situated on an elevation of rocks, whence it is fed by gravity to the aquarium tables and sea-water outlets in the laboratory. In the construction of this system the use of copper and other metals than lead has been avoided. All aquarium tables are equipped with several air-pressure outlets.

The adjacent boiler house, in addition to the central installation for the various systems of pipes, contains a storeroom and machine shop. The latter is equipped with lathe, drill press, band saw, carpenter's bench, etc.

Library

The Station Library is endowed to the extent of $40,000 through the generosity of the Rockefeller Foundation and through the Pillsbury Fund of Stanford University. There is a constantly expanding collection of books in the fields most under study (biology, botany, zoology, microbiology, oceanography, biochemistry, and physiology). About fifty journals in these fields are received. There is also a large and well-classified collection of reprints, museum bulletins, and pamphlets. Prompt interlibrary loans facilitate access to books in the main University collections, and in other institutions. A microfilm reader is installed.

Boats

There are several small skiffs for inshore collecting, and a 40-foot, Diesel-powered boat capable of collecting in the deeper waters of the bay. This was acquired in 1950 and named the "Tage" in honor of Emeritus Professor Tage Skogsberg, who carried on hydrographic work for many years in Monterey Bay. This boat has winches with 1200 meters of cable for deep sea sampling. It is equipped with radio receiver and transmitter.

Work of the Station

The Hopkins Marine Station is open during the entire year and maintains a permanent staff of resident investigators and technical assistants; it also accommodates other faculty members for teaching and research. It provides facilities for visiting investigators, and furnishes elementary and advanced instruction in biology.

The research program in a general way concerns itself with oceanic biology, including the relations between the organism and its environment. The spectroscopic and chemical study of pigments and photosynthesis in bacteria and algae is given special attention at present. A systematic survey of the fauna and flora is being undertaken and promising leads in the natural history of marine organisms are followed. Work on normal and controlled development of certain invertebrates is being prosecuted. There is good equipment for electrical measurements, and the study of bio-electric phenomena is emphasized.

Excellent material is available for research in plant and animal physiology, cellular biology, microbiology, experimental morphology, embryology, and taxonomy. In the last field, critical work, especially among invertebrates, is still needed.

Fauna and Flora of the Monterey Region

The extraordinary rich fauna and flora of the Monterey Bay region offer exceptional opportunity to the investigator and beginning student alike. There is a surprisingly large number of marine animals and plants readily accessible.

The wealth of marine forms is in part due to the diversity of environment, which ranges from a rugged granite coast, broken by beaches, to sheltered estuaries alive with mud-loving species. The near-by Seventeen Mile Drive and the Point Lobos State Reserve afford access to some of the finest of these habitats. Prospective visitors unacquainted with the central California coast may consult *Between Pacific Tides* (Ricketts and Calvin, Stanford University Press, 1948) and *Marine Algae of the Monterey Peninsula* (G. M. Smith, Stanford University Press, 1944) for descriptions of marine animals and plants of the area.

The Station is conveniently located with reference to the town, where living accommodations may be procured at cottages, apartments, and lodging houses. There are restaurants within walking distance. The secretary keeps on file a list of rooms in Pacific Grove, and it is advised that students arrive a day or two early in order to find accommodations before classes start. "Asilomar," administered by the National Y.W.C.A., often can accommodate some students; it is at the west side of Pacific Grove, easily accessible by car, and fairly easily by bus.

The tuition and required fees for all students registered for the full quarter are $220; for either half of the summer quarter the fees are $125.

Visiting investigators will be charged a minimum fee of $50 per quarter; and for the use of larger rooms or more expensive equipment upward of $100 per quarter.

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SCRIPPS INSTITUTION OF OCEANOGRAPHY

The Scripps Institution of Oceanography, La Jolla, Calif., a branch of the University of California, has no summer courses in biology, but throughout the year it offers to a few students and investigators in biology the opportunity for advanced study.

The Scripps Institution is a research and teaching institution, its faculty comprising the University's Department of Oceanography. It has 21 laboratories (several of them equipped with flowing sea-water) assigned to the biological sciences; an excellent library which is particularly strong in marine biology; an aquarium which can be used for biological studies; a thousand-foot pier; and a fleet of four large sea-going vessels and several small ones for field work. There is a great deal of biological material for study in the vicinity. Close to the Scripps Institution can be found beaches (both sandy and rocky), bays, and estuaries. Field work is done out to and beyond the edge of the continental shelf.

During the past few years, the Special Developments Division of the Scripps Institution has been doing a considerable amount of work on the development of gear for collecting biological specimens. Among its inventions are a floating fish-larvae trap and a trawl which collects specimens from mid-depths. The Division cooperates closely with faculty members and visiting scientists in developing gear designed to perform a specific collecting job.

Faculty members in the field of biology are Carl L. Hubbs, Professor of Biology, Martin W. Johnson, Professor of Marine Biology, Claude E. ZoBell, Professor of Marine Microbiology, Denis L. Fox, Professor of Marine Biochemistry, Marston C. Sargent, Assistant Professor of Oceanography and head of the Division of Marine Botany, and Wesley R. Coe, Research Associate in the field of biology.

The Scripps Institution has grown so rapidly in the past decade that at present facilities for students and visiting investigators are unhappily rather limited. However, qualified workers are welcomed, although there may be a waiting period involved. There is no set fee for the use of the Scripps Institution's facilities. All enquiries should be addressed to the Director, and all arrangements made with him.

Since the Scripps Institution is located in a resort town, living costs are rather high throughout the year.

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College Collaboration

Perhaps the most significant development of the year is implicit in reference by the Academic Dean of Mount Holyoke to the meetings with the Deans of Amherst, the University of Massachusetts, and Smith. A closer relationship between the four Connecticut Valley colleges has been in process of growth for a number of years, and, for various reasons, without publicity. The close proximity, diversity as well as common purpose, make collaboration almost a necessity. Last year there was a considerable interchange of both faculty and students, with a consequent enrichment of offerings. This has served to avoid certain needless duplication. But that has been only the beginning: the process continues on every front. The treasurers of the four colleges have met for a number of years; the librarians, the science clubs, the student officers, and the presidents. It is a long-range plan, but there is the possibility that years hence this will be the development of the mid-century on which we will place the greatest emphasis. There is no danger that in the process the four schools will lose their individual personalities; the opportunity for growth and enrichment, on the other hand, are very great.—Mount Holyoke College *Bulletin*.

SUMMER BIOLOGY AT UCLA

In the Los Angeles area there are several institutions of higher learning, all located fairly close to each other; these are the University of Southern California with an annual daytime enrollment of about 13,000 students, the California Institute of Technology at Pasadena with a student enrollment of about 1000, and the University of California at Los Angeles, with an annual daytime enrollment of about 15,000 students. UCLA is one of the eight campuses of the University of California; the other seven being located at Berkeley, San Francisco, Davis, Mount Hamilton, La Jolla, Riverside, and Santa Barbara. While research work is carried on at all of the eight campuses, the degree of Doctor of Philosophy is given only at two, Berkeley and UCLA.

Summer Sessions are held at the Berkeley, Santa Barbara and Los Angeles campuses. The purpose of the Summer Session program in general is to provide essential training for all types of students, including teachers, school executives, nurses, homemakers, social workers, and other professional groups, as well as for undergraduate and graduate students who are working toward degrees. This year the UCLA Summer Session will last for eight weeks, beginning on June 18 and continuing until August 11. The tuition for the eight-week period is $64; no additional laboratory fees are required.

Summer Session biology courses are offered by faculty members from the Department of Zoology and the Department of Bacteriology, which are a part of the College of Letters and Science, and by faculty members from the Division of Botany, which is a part of the College of Agriculture.

Professor Karl C. Hamner, whose research is in the field of plant physiology, is Chairman of the Division of Botany. In the summer emphasis is placed on the research problems of graduate students. In addition, usually two or three selected lower division courses in general botany and field botany are given. During this particular Summer Session a course in General Botany will be offered covering introductory work on the structure, functions, distribution, evolution and economic uses of plants. Several faculty members have summer appointments to carry on their own research work and will be available to help set up and guide the research problems of graduate students.

A recent acquisition by the Division of Botany is the new Plant Physiology Building which affords ample research facilities for graduate students. This building will house the Division's extensive herbarium of native California plants and is equipped with plant preparation rooms, dark rooms, and a plant physiology classroom. It also has a greenhouse with automatic temperature-humidity controls.

The Botany Division at UCLA maintains on campus a Botanical Garden consisting of many unusual subtropical trees and shrubs.

On the western border of the UCLA campus is located Faculty Hill, an area of California chaparral where botanists may become acquainted with some of the native California wild flowers and shrubs, and zoologists may observe some of the chaparral birds and reptiles. Not far away are the Santa Monica Mountains where students may see the interdigitation of coastal sage and chaparral vegetation—and where they also may follow the coastal sage down to the Santa Monica and Malibu beaches where swimming and sunbathing afford pleasant recreation.

The Department of Bacteriology is headed by Professor Anthony J. Salle, who is at present conducting research on antibiotics. Other research programs under the guidance of faculty members concern Leptospirosis and Brucellosis.

Summer Session students will be able to take advantage of several courses which will be offered by the Department of Bacteriology this summer. Professor Salle will present a series of lectures on General Bacteriology, a cultural course for non-technical students, and will also conduct a lecture and laboratory course in Introductory Bacteriology and Microbiology for technical students. Courses which will be available to undergraduate students include Advanced Bacteriology, Serology, Problems in Bacteriology, and Proseminar library problems. Graduate students will be offered a course in Advanced Bacterial Physiology and will be able to carry out researches in microbiology under the guidance of faculty members.

The Department of Zoology is headed by Professor Theodore L. Jahn, protozoologist and physiologist, who is conducting research on the physiology of vision in insects and on internal metabolism of protozoa. Summer Session courses will be offered in Microscopical Technique; Elementary Zoology and Physiology, primarily for physical education, pre-nursing, pre-optometry students and other non-zoology majors; Parasitology, lectures and laboratory; and Vertebrate Embryology. Two new courses in neuro-physiology will be given this summer: Dr. Frederick Crescitelli will present a series of lectures on Vertebrate Physiology, with emphasis on the physiology of those systems which are concerned with the integration of body functions and with determination of behavior, such as sensory phenomena, reflexes, motor coordination and visceral functions. Prof. Jahn will lecture on the comparative morphology and physiology of sense organs, especially those of photoreception, phonoreception, and chemoreception in vertebrates and invertebrates.

Both graduate and undergraduate students will be able to carry out research problems under the guidance of faculty members, and undergraduate students will receive credit upon the completion of reading problems, also under the direction of faculty members.

In addition to classrooms and laboratories in the Physics-Biology Building, the Department of Zoology maintains a Vivarium where research on animal biology is carried out. This includes the Ponty Building which has facilities for research in endocrinology; the Cancer Research Unit in which is undertaken research on cancer and allied problems; the Experimental Embryology Unit which affords space to students conducting research problems on developmental embryology and serology; the Fisheries Lab which is a part of the fisheries program under the direction of Dr. Boyd Walker; and laboratory space for students conducting research in ecology, parasitology, protozoology and other fields of zoology.

Of particular interest to biologists and naturalists who enjoy field trips are two Life Science courses which will be offered this summer by the Department of Zoology. Professor R. B. Cowles will conduct a course in General Biology which will deal with the principles of natural history, with special emphasis on man in relation to his organic environment, and which will give an introduction to the common species of plants and animals of Southern California. Laboratory demonstrations will be arranged and several field trips will be planned.

One field trip will be to the desert region near Palm Springs and the Salton Sea. The course of this trip will range from sea level to an elevation of 5000 feet, then back down to the final camp below sea level. This will afford students of biology an excellent opportunity to observe the changing life zones with their characteristic flora and fauna. Because of the extreme heat during the day, the work on the desert will be confined to the hours before dawn when it is sufficiently cool and from after sunset until midnight when there is good night collecting of desert reptiles. The morning hours will be spent getting acquainted with the fauna and flora of the extensive sand dune areas. The animals found in these areas are extremely interesting—shovel-nosed ground snakes which burrow into the soil; fringe-footed lizards which have wedge-shaped heads suitable for digging and which have "sand-shoes" on their feet, so that they are beautifully adapted for "swimming" through sand; and sidewinders, rattle-snakes of the genus *Crotalus* which have a very unusual and interesting sidewise locomotion. On the return trip the rocky mountain areas will be worked for animals like the chuckawalla which inhabit such regions. Ocotillos, cholla or teddy-bear cactus, and agaves will provide excellent subject matter for kodachrome enthusiasts.

The daytime hours of the second day of the field trip will be spent in the higher mountain areas in a climate comparable to that found in such states as New York and Illinois. This is a transition zone and on this part of the trip one will traverse regions of biological change comparable to those encountered in a trip from Florida to New England.

A second field trip will be conducted to the Mojave Desert, 3000 feet above sea level. There the biology students may become acquainted with Joshua trees, larrea bushes, and the animals which live in or near them. One of these animals is the desert spiny lizard which may be found on the sides and branches of the Joshua trees, basking in the morning sun. Another lizard of particular interest which is found on the Mojave Desert is the Yucca night lizard. These small creatures measure a little more than an inch and a half from tip of nose to base of tail and are usually found under fallen Joshua logs. They are one of the few lizards which do not lay eggs, but give birth to living young, usually twins. Another thing which sets them apart from the other desert reptiles is the fact that they do not all disappear underground during the winter months, but may be collected all year long. In the summer time there are many other desert animals which have come out of hibernation and students may spend some very interesting hours observing the hopping kangaroo rats, the fast-running side-blotched lizards, the slow-moving horned lizards or "horned toads," and occasionally the very slow-moving desert tortoises.

A third field trip will be conducted to Mt. Piños where there are piñon pines and other mountain pines, and avian fauna such as piñon jays, woodpeckers and nuthatches, and where perhaps one of the few remaining condors will fly high overhead, disdaining to approach too close to civilization.

A course of value to both students and teachers of biology will be given by Mr. L. Herbst, Methods and Materials in the Teaching of the Life Sciences. Mr. Herbst will discuss such subjects as classroom materials and techniques used in teaching biology, human health and hygiene, human physiology, botany, and zoology. He will include lectures and demonstrations on audio-visual aids, experiments, sources of free materials, and the techniques of collecting, preserving and identifying the flora and fauna of Southern California. Two week-end field trips are planned for this course, similar in extent and range to those described in connection with the General Biology course.

For those biologists who like to plan their own field trips, the San Diego Zoo is not too far away. This is one of the most outstanding outdoor zoos in the country and is well worth a week-end visit.

On the edges of the UCLA campus are sorority and fraternity houses, residence halls for women and for men, and private homes, where living accommodations will be available to Summer Session students. The University Housing Office prepares and distributes lists of the addresses offering accommodations in dormitories, sororities, fraternities and cooperatives.

The Women's Physical Education Building and the Men's Gymnasium will provide facilities for sports and recreation — swimming pools, tennis courts and handball courts, just to mention a few. Recreational evenings will be planned to include dancing, games, swimming, and sports for all Summer Session students; special meetings for folk and square dancing will be held regularly each week; and three productions will be presented by the Summer Theater Workshop during the Session.

Alpha Upsilon Chapter of Phi Sigma is active on the UCLA campus and derives its membership from the botany, zoology, bacteriology and agriculture students. The chapter is sponsored by Dr. B. O. Phinney of the Division of Botany. Its program includes evening lectures on biology and related subjects featuring guest speakers, and field trips to nearby points of local interest. Any Phi Sigma members planning to enroll in Summer Session at UCLA this year will be most cordially welcomed by the members of Alpha Upsilon Chapter, who can assure them that a summer spent in California will afford much pleasure, both from a recreational and a biological point of view.

COLORADO

ROCKY MOUNTAIN LABORATORY

The Rocky Mountain Biological Laboratory is located near Crested Butte, in the central part of Western Colorado at an elevation of 9500 feet. High mountains are literally on all sides, ranging in altitude from 11000 to over 13000 feet. Eight of these mountains are so close to the laboratory buildings that they can be reached on foot for class study and for collecting purposes, returning the same day.

This laboratory was organized in April 1928 by professors of Zoology and Botany from the University of Oklahoma, the University of Illinois and Western State College of Colorado. It is chartered by the Secretary of State of Colorado as a non-profit corporation of university rank, with the power to give graduate and undergraduate courses in Biology, to carry on research, and to grant degrees, if it so desired.

It therefore has two chief functions to perform: (1) to give certain courses in Zoology and Botany to upper classmen and to graduate students, and (2) to promote research, either by independent investigators from the faculties of universities and colleges, or by students under the direction of staff members of the R.M.B.L.

At present the members of the corporation of The Rocky Mountain Biological Laboratory come from the staffs of the Zoology and Botany Departments of more than twenty universities and colleges, widely scattered throughout the United States.

The members of the Board of Trustees are: Dr. A. O. Weese, Professor of Zoology, University of Oklahoma; Dr. Reginald D. Manwell, Professor of Zoology, Syracuse University; Dr. B. D. Barclay, Professor of Botany, University of Tulsa; Dr. J. Fisher Stanfield, Head, Botany Department, Miami University, Ohio; Dr. John C. Johnson, Professor of Biology, Pennsylvania State Teachers College, Edinboro.

Since The Rocky Mountain Biological Laboratory is located in the high Colorado Rockies, and operates only during the summer, it is quite obvious that field work and the ecological aspects of the high mountain fauna and flora should be emphasized.

The following courses are given each summer: Bioecology, Field Botany, Parasitology and Mammalogy. The Instructional Staff members this summer are: Dr. H. G. Barclay and Dr. B. D. Barclay, University of Tulsa; Dr. R. W. Strandtmann, Texas Technological College; Dr. H. B. Sherman, University of Florida; and Dr. Paul T. Wilson, College of Marin, California.

Also research under direction of staff members may be undertaken. In addition, independent investigators carry on such research projects as they wish.

Occasionally other courses in Biology are given, if there is sufficient demand, such as Field Zoology, Ornithology. Field Geology has also been given a few times.

Other members of the Instructional Staff, who take their regular turn every three or four years are: Dr. Reginald D. Manwell (Parasitology), Syracuse University; Dr. J. Fisher Stanfield (Field Botany), Miami University; Dr. W. H. Emig (Field Botany), University of Pittsburgh; Dr. C. Lynn Hayward (Ecology), Brigham Young University; Dr. F. J. Trembley (Mammalogy), Lehigh University; Dr. J. Teague Self (Parasitology), University of Oklahoma; Dr. Harold M. Hefley (Ecology), Mississippi Southern College; Dr. B. R. Coonfield (Mammalogy), Brooklyn College; Dr. Paul T. Wilson (Mammalogy), College of Marin, California; Dr. Victor H. Dropkin (Parasitology), Roosevelt College; Colonel George W. Hunter III, (Parasitology) Medical Zoology Section, United States Army.

All courses are taught by highly qualified staff members who are experts in their particular fields. Each staff member teaches only one course, always has the Ph.D. degree and holds a prominent position in Zoology or Botany in some university or college.

Since every staff member holds the doctor's degree, and each student may take a maximum of only six semester hours of course work or research, during the six weeks summer session, the credits earned by both graduate and undergraduate students have always been accepted at full value by all universities and colleges wherever presented.

The area around the R.M.B.L. is truly unique for both the botanist and zoologist, since it is almost virgin territory, much of it completely unmolested, just as the Indians left it in 1878.

In fact, the U. S. Forest Service has set aside for research purposes some 905 acres of land near the laboratory buildings, including some 500 acres of virgin Engelmen Spruce-Fir forest. This area stretches from the valley floor at about 10,000 feet to snow masses around 12,000 feet, well above timber line.

In addition to the high mountains and spruce-fir forest areas, there are closeby, two rivers, many smaller streams, lakes, ponds, bogs, swamps, mesas and valleys. During July and August most of these areas are in optimum condition for class study and for research purposes.

The Colorado Game and Fish Commission also cooperates wholeheartedly with the students and investigators at The Rocky Mountain Biological Laboratory, even to the extent of sending some of their field and research staff members to aid in collecting birds and mammals for study in the Parasitology and Mammalogy classes.

Since the R.M.B.L. is strictly a nonprofit institution, the expenses are kept to a minimum. The total expenses for the six weeks session this coming summer will be only $195.00. This includes all laboratory fees, board and lodging. If a person does his own cooking in a cabin, the expenses for the six weeks are only $117.00 (cabin and laboratory fees).

Recreation opportunities at the R.M.B.L. are the finest. A person can indulge in such activities as hiking, high

Site of Laboratory (Altitude 9,500 ft.) at the foot of Gothic Mountain (12,646 ft.) showing some of the buildings.

mountain climbing, horse back riding and trout fishing. There are many miles of open trout streams within and adjacent to the laboratory grounds. While the main function of this Laboratory is study and research, every student and investigator is encouraged to make use of these exceptional recreation opportunities.

So, if any student of Botany or Zoology wishes to study the plants or animals of the high regions of the Rockies, he would certainly find it a unique opportunity to spend a summer session at The Rocky Mountain Biological Laboratory. Professors of Zoology or Botany from universities and colleges, who wish to do independent research would also find almost unlimited opportunities.

Any person interested in the Biological Sciences, can become a member of the corporation, upon approval of the Board of Trustees, by paying the annual dues of two dollars. Professors of Zoology and Botany may also receive permission to build personal cabins on the R.M.B.L. grounds. The cost of a half dozen lots, upon which a biologist may build such a cabin, is very reasonable.

One of the most worthwhile features of spending a summer of study or research at The Rocky Mountain Biological Laboratory is the meeting of biology students and professors from a number of universities and colleges, widely scattered throughout the United States.

The annual bulletin announcing courses, staff members and expenses can be secured by writing to the Director, Dr. John C. Johnson, 108 Meadville St., Edinboro, Pennsylvania.

John C. Johnson

April 6, 1951

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Expanded Definition of Higher Education

The definition of what constitutes a truly educated person has expanded so prodigiously within a single generation that the average college graduate of 1948 may be as ill-equipped for his place in the outside world as the average high-school or even elementary-school graduate at the turn of the century.

The fact that the term "higher education" has become a misnomer is not the fault of the educator. Blame history. History stopped crawling about eighty years ago and began to catapult. The danger so well described by Whitehead—the danger that events might outrun man and leave him a panting and helpless anachronism—is by now much more than a figure of speech. We have leaped centuries ahead in inventing a new world to live in, but as yet we have an inadequate conception of our own part in that world.

Confronted with this sudden and severe "upset in the metabolism of history," as Professor Donald H. Andrews, of Johns Hopkins, calls it, what is it we expect education to do? No single answer can possibly have enough elasticity to be all-inclusive. We expect it to narrow the gap between the individual and society. We expect it to shorten the distance between individual capacity and collective needs. We expect it to produce the rounded man. We expect it to enlarge the ability to think and the capacity for thought. We expect it to be helpful in creating constructive attitudes—both on an individual and a group basis. We expect it to impart basic and essential general knowledge for rounded living, and basic and essential specialized knowledge for specific careers. We expect it to develop ethical values. In short, we expect education to furnish the individual with the necessary intellectual, social, moral, and technical clothing for a presentable appearance in the world community.—Norman Cousins, in *New York State Education.*

FLORIDA

MIAMI MARINE LABORATORY

THE MIAMI MARINE LABORATORY was established in the University of Miami during the winter of 1942 in response to the need for a tropical oceanographic institution readily accessible to the educational and scientific centers of the United States. Geographically the most southern part of this country, South Florida is faunally part of the West Indies, the principal ports of which are readily reached by air from Miami.

The tropical conditions unique among stations in the United States, make it possible to offer training in an aspect of biology which is a valuable part of the education of all botanists and zoologists. The climate also permits the study of marine biology, oceanography and the constituent sciences under favorable year-round conditions, not only as summer field courses, but as part of a full-time university curriculum.

The terrific competition for food and space on the coral reefs and the enormous variety of species, of adaptations, of feeding habits and of methods of attack and defense, provide a living classroom and a workshop for the study of fundamental branches of biology. Furthermore, the physiologist, behaviorist, ecologist, embryologist, or biochemist who uses marine animals and plants merely because of their convenience and not because of an interest in the ocean is immensely benefitted by being able to work at a tropical station where the organisms are active for twelve months every year.

Facilities and Activities

Laboratory accommodations are equipped with standard instruments

Miami Marine Laboratory 1950

for research in oceanography, fisheries and marine biology, including X-ray equipment. A small radiation isotopes laboratory will also be available this year. For field work three motor vessels and a floating laboratory ranging from 38 to 104 feet are provided. Ordinary field equipment, such as nets, dredges, plankton gear and deep sea oceanographic sampling instruments, is available. Diving helmets and masks are used for collecting on the coral reefs.

A museum collection of the marine fishes, invertebrates and plants of Florida and the West Indies is maintained for reference purposes and is being continually enlarged to meet the needs of research workers and students. A departmental library provides standard oceanographical references and the principal scientific marine journals of the world. More general publications are available in the main library of the University.

The research staff includes eight full time faculty members, ten research assistants and ten associates who are engaged in fundamental research in tropical fisheries, marine biology and oceanography. Basic and applied research is also conducted in behalf of the United States Government, the State of Florida, and in cooperation with the Cuban Navy, the National Geographic Society and various other government and industrial organizations. Applied research ranges from commercial fisheries development and management to the effects of industrial pollution, the prevention of ship bottom corrosion and fouling, tropical deterioration of electronic equipment, the development of commercial products of marine origin, and intensive studies of currents in the Gulf Stream. Fundamental studies in the marine sciences are carried out as part of a balanced program.

The Laboratory in 1948 organized the

Oceanography Class on the Floating Laboratory

GULF AND CARIBBEAN FISHERIES INSTITUTE, which meets annually and brings together scientists, state and government officials, and representatives of industry for the purpose of discussing problems and developments connected with the fishing industries of the Southeastern United States and the West Indies. *The Bulletin of Marine Research of the Gulf and Caribbean* is also published by the Laboratory.

Those wishing to engage in independent research as visiting investigators should communicate with the Director, stating the nature of the proposed investigations. Only a limited amount of space is available and applications should be made well in advance.

The Teaching Program

The Laboratory conducts a Department of Marine Sciences which offers the fullest program of advanced study in this field available on the Atlantic Coast of the United States.

Two introductory courses are offered for undergraduates or for graduates who do not wish to specialize in this field. The remaining courses form an integrated curriculum leading to higher degrees in oceanography, marine biology or fisheries. All courses are taught by men who are research specialists in their fields.

The training of graduate students in fisheries, marine biology and oceanography is greatly enhanced by the unusual opportunities for practical experience. Students who show research ability and who meet the academic requirements may take part in investigations which are part of the laboratory research program either as graduate fellows or as research assistants. In this way they may, for instance, engage in actual fisheries investigations in Florida and the West Indies or in marine biological and oceanographic work in Gulf of Mexico and

Floating Laboratory

Caribbean waters, while studying for higher degrees.

No undergraduate degree is offered in the Department of Marine Sciences, but students should seek the degree of Bachelor of Science with a major in one of the biological or physical sciences. A strong background in the physical sciences is advisable, and Oceanography 203 and Marine Biology 204 should be included. Any student interested in the field should consult the Department of Marine Sciences in order to coordinate preparation for work in Marine Sciences with satisfaction of the requirements of his major department.

Conditions of Admission

Further information regarding the academic requirements and conditions of admission may be found in the General Bulletin, obtainable upon request from the Director of Admissions, from whom application forms may also be obtained. Graduate students should apply for admission to the Dean of the Graduate School, from whom the Graduate Bulletin may be obtained.

Fellowships

A limited number of graduate fellowships carrying a stipend of $750 for the eight months academic year are available. Fellows may take a maximum of 10 semester hours of credit and are required to assist in the research programs of the Laboratory.

Living Accommodations

Since the Marine Laboratory is part of the campus of the University no special quarters are provided. Rooms in the University Residences are reserved by application to the Director of Housing.

◆

Universal Adaptation

JAMES McCOSH

The mind is suited to the position in which it is placed in the world, and the world is adpated to the minds which are to observe and use it. There is order in the world, and man is so constituted as to discover and to admire it. There is reason in the works of God, and reason in man's mind to appreciate it. "If the laws of our reason," says Oerstad, "did not exist in nature, we would vainly attempt to force them upon her; if the laws of nature did not exist in our reason, we should not be able to comprehend them." The forms which minerals assume when they crystallize; the elliptic orbits of the planets; the hyperbolic curves of the comets; the spiral conformations of the nebular groups of the heavens, of the appendages of plants around their axes, and of the whorls of the shells of molluscs; the conical shape of the fruit of pines and firs with the rhomboids on their surface, are all constructed according to mathematical laws which have their seat in the intelligence and can be evolved by pure thought. When we ascend to the higher manifestations of life in particular, when we rise to the human form, we do not find the same rigid lines as in crystals, nor are the invariable curves of the nebulæ and plants so observable; but I believe they are still there blended in innumerable ways so as to give an infinite sweep and variety to the graceful forms on which the eye ever delights to rest, and which the mind never wearies to contemplate, and unconsciously follows now the one and now the other till it is lost in a perfect wilderness of beauty.

IOWA

LAKESIDE LABORATORY

The Iowa Lakeside Laboratory, a biological field station, is located in the lake region of northwest Iowa. Its campus is a tract of some hundred acres of natural prairie adjacent to Miller's Bay on the west shore of West Okoboji Lake. The entire shore line of this section of the lake is controlled by the laboratory and thus serves as a natural collecting and experimental ground for the work of the students and staff.

Buildings

The buildings are divided into two groups and are located in two areas. One group includes four native stone laboratories and the library while to the north is the residential area composed of individual cottages, dormitories, and a commodious dining hall with expansive porch facing the lake.

Field Biology at the Iowa Lakeside Laboratory

The Laboratory is especially designed to provide an opportunity for students to meet directly the natural conditions of plant and animal life as they exist in the field. Hence the course of study supplements the regular course work given formally during the year by accredited colleges and does not take the place of such courses. The student is encouraged to gain experience and knowledge of the normal behavior, habits, and habitats of animal and plant species found in the field. A true appreciation of nature is combined with a scientific approach. The summer period enables the student to concentrate his interests at a time when seasonal conditions are most favorable.

The course of study is adapted for students of biology, conservation, and those interested in the teaching of biology. The Laboratory also encourages independent research by qualified investigators.

Students working for advanced degrees should not plan to complete an entire graduate program at this laboratory, although graduate credit may be earned and credited toward such a degree. The laboratory facilities offer excellent opportunities for development of thesis projects.

Flora and Fauna of the Region

The Iowa Lakeside Laboratory offers interesting opportunities for the study of plants. Habitats ranging from high morainic knobs to lakes and kettle holes support a variety of plant communities. Rather deep ravines are wooded, and some of the springs support hanging bogs.

Abundant lakes and kettle holes harbor a wide variety of water plants, both seed plants and lower forms. The many kinds of phytoplankton have attracted students for years. Herbarium, library, and laboratory facilities are available for the study of most plant groups.

For the study of animal life, there is a broad range of terrestrial and aquatic habitats. Numerous small lakes, ponds, streams, wooded areas, and fields are readily accessible by motor car, boat, or within hiking distance. The fauna is representative of the Upper Missouri and Mississippi valley region.

Following the active breeding seasons of many of the vertebrates, attention is turned toward the invertebrate fauna, which is abundant and varied. Sponges, polyzoans, hydra, acquatic, terrestrial, and parasitic nematodes, flatworms, rotifers, oligochaetes, and leeches are plentiful and easily obtained. Protozoa, rotifers, and microcrustacea occur in great numbers in the plankton of the deep West Okoboji Lake, Spirit, Gar, and other lakes. Little is known of the bottom fauna of the locality. Numerous hanging bogs, kettle holes, and temporary ponds likewise present supplementary materials.

In addition to the Field Biology course, the men on the staff are available for directing research, thesis projects, and consultations.

Facilities for Instruction and Research

The Laboratory provides equipment for the field work as well as necessary laboratory equipment for class work such as microscopes, lamps, camera lucida, and other standard items. A station wagon and other transportation is furnished for distant field trips.

The Laboratory has a limited stock of the more commonly used reagents and supplies. Anyone anticipating the need of special apparatus should communicate with the Director in advance. The electric current is 110 volts A.C. Those wishing to bring their own microscopic lamps or any laboratory electrical equipment adapted to this current may do so.

A working library is maintained and special books and other publications may be secured from the University if occasion demands. Microscopes and collecting apparatus are furnished and a dark room is provided for photographic work.

General Living Conditions

Several small cottages for families are located on the campus overlooking the lake. Separate dormitories for men and women and rooms for couples are maintained. Meals are served regularly at the main dining hall which comfortably accommodates the entire group of students and faculty. No provisions are made for light housekeeping.

Hot and cold shower facilities are located in bath houses and sanitation is provided by a modern sewage disposal plant.

Minor laundry can be handled through facilities at hand, but no special laundry equipment is available. However, laundry can be taken care of locally at a nominal cost.

While serious work is the order of the day, recreational activities are not lacking. Swimming, boating, and fishing are the most popular sports. Golfing facilities are available at popular priced public links in the vicinity.

The library is used as a study hall and reading room.

Equipment

Cots and mattresses only are furnished by the Laboratory. Bedding should include pillows, pillow cases, sheets, and sufficient blankets for nights with temperatures as low as 40° F.

Clothing should be chosen which is suitable for camp or country wear. It should be of the type which will give reasonable protection against brush, barbed wire, and poison ivy.

It is advisable to provide (a) a change of wool outfits (two sets) for cool days, sweaters, woolen jacket or equivalent should be included. (b) One pair of hiking boots, at least 2 pairs of sneakers or other light, rubbersoled footwear to take care of several days of rain, during which time it is difficult to dry leather shoes. (c) High wading boots are very desirable. (d) A raincoat and hat are indispensable.

Part-time jobs helping in the mess and laboratory are available for a few students to earn a part of their expenses.

Board: For adults, $65.00 per term. For children through five years, $32.50 per term; from 6 to 10 years, $48.75 per term.

Lodging: Dormitories, $2.50 per week; Rooms for couples—main cottage—$4.00 per week. Frame cottages for families, $5.00 per week. Stone cottages $10.00 per week (private); White cottage, $10.00 per week.

Facilities are set up for adults. If it is necessary to bring children under table age, special arrangements must be made with the business manager.

Registration

Registration will be held at the Laboratory on Monday, June 11, for the first term, and on Monday, July 16, for the second term.

The dormitories, cottages, rooms, and dining hall will be opened on June 9. Students should arrive by Sunday, June 10, if possible. Those coming by train will be met by car at nearby towns if notice is sent to the Director in ample time.

Students who have been registered at Iowa State College, Iowa State Teachers College, or at the State University of Iowa must register for work at Lakeside Laboratory through the

Office of the Registrar in the respective institution. Applicants who wish to register for work at Lakeside Laboratory and who have not previously attended any of the State institutions in Iowa must register for work through the Office of the Registrar at the State University of Iowa.

Graduates who expect credit, if not already enrolled in the Graduate College of the State University of Iowa, must be formally admitted after written application accompanied by a transcript of undergraduate and graduate credit. This should be done before the session opens. Transfer of credit to other institutions can not be granted unless matriculation in the Graduate College of the State University of Iowa has been first completed.

Application for admission should be made at once, since space in the Laboratory and in the dormitories and cottages is allotted in the order in which applications are received.

The applications of undergraduates not enrolled in the University should be accompanied by a statement of their credits together with certification of good standing from their respective schools.

Democracy Is Worth Worrying About

The faculty are amazed . . . But there's nothing to be amazed at.

"How can students concentrate on school when they have no idea what's coming next . . . when they don't know when they'll be drafted, if they'll be able to finish school." That's what the faculty are amazed at.

They are surprised that we aren't reading newspapers in the classrooms, that we are doing homework, and that most of us are striving to get the best marks possible.

But they shouldn't be surprised. When, in the twenty-three or four years that this generation has been alive, have we been able to tell what's coming next? When have we been able to experience normal times?

First there were the boom years of the late twenties. Then the long depression. Then with the outbreak of hostilities in China came the start of the war . . . a series of conflicts that may well be known in the future as the "Second Hundred Years War."

We are the "Missed" generation. We've missed normal times. Of necessity we've adjusted to the uncertainty of the future. We've learned never to know what's coming next. We've learned to adjust to the big "IF."

"IF nothing happens, I'll go into advertising."

"I'll take a course in Shakespeare next year IF I'm still around."

"Next year we'll have a better football team IF all our players aren't drafted."

IF . . . the perpetual "IF."

We haven't particularly enjoyed this adjustment. Man is a funny creature. Somehow he adjusts to what is necessary.

Of course it would be nice to know what it's like to live in the clean, healthy atmosphere of peace. It would be nice to know that we could choose our careers after graduation. IF . . .

No, we don't read the headlines in classes. We concentrate on our homework. We have to. It's a matter of doing the best we can at the job we have at hand. It's a matter of taking things as they come.

Naturally every student wants to finish school if he can, particularly the veterans who have had their careers interrupted once.

We'd like to graduate, to get started on careers, have families and just enjoy living.

Sure we're worried. But democracy is worth worrying about. We'll take things as they come. — H. S. G., in *Northeastern News* (Boston).

MAINE

MOUNT DESERT ISLAND LABORATORY

The Mt. Desert Island Biological Laboratory is now the only American marine laboratory servicing the Acadian area, that north of Cape Cod. The Laboratory is operated largely by biologists and for biologists. Its sole purpose is to offer basic research facilities which its workers can use as seems best to them. The Laboratory is supported by no institution or foundation, and is not committed to a single specialized program. While the Laboratory operates primarily for biological research, it also welcomes mature teachers and students whose primary aim is to secure first-hand knowledge of a regional fauna and flora. In the past the Laboratory has ventured sporadically into the field of formal undergraduate work, but it now feels that it can do a more worthwhile educational job by training in research young people who have committed themselves further to biology than has the summer school undergraduate.

The Laboratory was founded at South Harpswell, Maine, in 1898 under the name of The Harpswell Laboratory, by Dr. J. S. Kingsley of Tufts College. In 1913 it was reorganized as a scientific (non-profit) corporation under the laws of the State of Maine. In 1921, the Laboratory was moved to its present location at Salsbury Cove, Mt. Desert Island, Maine, and in 1923, its name was changed to the present one. Its original land at Salsbury Cove was deeded by the Wild Gardens of Acadia, and its present development in land, buildings, and equipment has come largely from the gifts from private philanthropy. Despite lack of endowment, and ample revenues, the Laboratory has grown and developed steadily, so that today despite its financial anemia it carries only a small, self-liquidating debt. For operating revenue it depends on laboratory fees, cottage rentals, and membership dues. For capital improvements and other expenses, it depends on the generosity of its friends.

The Laboratory buildings are equipped with the basic facilities for research. There is running salt and fresh water, electricity, Pyrofax gas, distilled water, compressed air, tanked O_2, a marine dock, aquaria, live-cars, dark room, clincal centrifuges, chain-o-matic balance, electric ovens and refrigerators, Beekman pH meters, basic chemicals, glassware, smaller apparatus, and collecting equipment. The tissue culture laboratory is a model for organization and equipment. The Laboratory will buy special apparatus which has a long-term usefulness to the Laboratory. Investigators, however, are urged to bring their own specialized equipment and chemicals. Since the Laboratory is closed for nine months and is unheated, the care of much permanent delicate equipment is too hazardous an undertaking.

Individual research rooms rent from $75 - $250 for the annual season from June 15 to September 15. For some space, smaller monthly or weekly rates are available. Each worker is, of course, entitled to the facilities of the Laboratory, but is requested to bring his own specialized equipment. Several Fellowships supported by the Ulric Dahlgren Fund are available annually to research workers or students (except undergraduates). These fellowships cover all or part of the laboratory fees. Rooms in private homes, tourist camp cottages equipped for housekeeping, and a few larger cottages are available in the immediate vicinity. For non-cottagers, board is supplied in the Dining Co-op in Bowen Hall. In the Co-op a competent cook is hired, but the organization and the work is done by the members of the Co-op on a non profit basis. All applications and inquiries (except as noted above) should be addressed to:

J. Wendell Burger, *Director*,

Trinity College,

Hartford 6, Connecticut

MICHIGAN

MICHIGAN BIOLOGICAL STATION

The University of Michigan Biological Station was established in April, 1909 for the purpose of giving instruction and directing and conducting research in those aspects of botany and zoology in which this best can be accomplished at a field station. Each summer since its founding, it has held an 8-week session on the shore of Douglas Lake near the northern tip of the Lower Peninsula of Michigan. A unit of the University of Michigan, the Station is administered through the Summer Session by an Executive Committee currently composed of Professor Dugald E. S. Brown, Chairman of the Department of Zoology, Dean Samuel T. Dana of the School of Natural Resources, Professor Kenneth L. Jones, Chairman of the Botany Department, and Professor A. H. Stockard, Director of the Biological Station, all of the University of Michigan.

The resident instructional faculty of the Station consists of a relatively permanent group of biologists recruited from a number of colleges and universities over the United States, each teaching courses and conducting and pursuing research in his specialty. Credit is in semester hours, and the classes meet by the day rather than by the hour. Two-hour courses meet on one full day each week and four-hour courses meet on two days. Six credit hours is regarded as a normal load, though many students take as many as eight. All courses give regular University of Michigan graduate credit, though all classes are open to qualified undergraduates. The faculty and the courses and research topics to be conducted by them in 1951 are as follows:

In Botany:

1. Dr. Margaret H. Fulford, Associate Professor of Botany at the University of Cincinnati, will conduct a 2-semester hour introductory course on bryophytes, and a 2-hour advanced course on bryophytes, and will direct research on that group of plants.

2. Dr. Frank C. Gates, Professor of Botany at Kansas State College, will conduct a 4-hour course on plant ecology and direct research on that topic.

3. Dr. Carl D. LaRue, Professor of Botany at the University of Michigan, will conduct a 4-hour course on plant anatomy and will direct study and research on plant anatomy, tissue culture and morphogenesis.

4. Dr. Alexander H. Smith, Professor of Botany at the University of Michigan, will conduct a 2-hour course on the higher fungi and direct research on that group of plants.

5. Dr. Gilbert M. Smith, Professor of Botany at Stanford University, will conduct a 2-hour course on the freshwater algae and direct research on that group.

6. Dr. Carroll E. Wood, Jr., Instructor in Botany at Harvard University, will conduct a 2-hour course on the systematics of the flowering plants, and a 2-hour course on the aquatic flowering plants, and will direct research on the systematics of the flowering plants.

In Zoology:

1. Dr. David C. Chandler, Associate Professor of Limnology at Cornell University, will conduct a 4-hour course on limnology and direct research on that topic.

2. Dr. Charles W. Creaser, Professor of Zoology at Wayne University, will conduct a 4-hour course on the biology of fishes and direct research on the biology of vertebrates.

3. Dr. Frank E. Eggleton, Associate Professor of Zoology at the University of Michigan, will conduct a 4-hour course on the natural history of the invertebrates and direct research on that topic.

4. Dr. Frank F. Hooper, Instructor in Zoology at the University of Michigan, will conduct a 2-hour course on limnological methods and direct research in limnology.

5. Dr. Herbert B. Hungerford, Professor of Entomology at the Univer-

sity of Kansas, will conduct a 4-hour course in entomology and direct research on the biology of insects.

6. Dr. Gilbert F. Otto, Associate Professor of Parasitology at Johns Hopkins University, will conduct a 4-hour course in protozoology and direct research on that group.

7. Dr. Olin S. Pettingill, Jr., Associate Professor of Zoology at Carleton College, will conduct a 3-hour introductory course and a 2-hour advanced course in ornithology, and will direct research on that topic.

8. Dr. Lyell J. Thomas, Professor of Zoology at the University of Illinois, will conduct a 4-hour course on helminthology and direct research on the parasitic worms.

9. Dr. Frederick H. Test, Associate Professor of Zoology at the University of Michigan, will conduct a 2-hour course on the biology of terrestrial vertebrates and conduct research on the biology of vertebrates.

In addition to the work of the instructional staff, an extensive program of research in forestry, including comparative studies on planting, pruning, soils, growth rates and harvesting methods is being conducted by Professor Willett F. Ramsdell of the School of Natural Resources, University of Michigan.

The eighteen formal courses, eight in botany and ten in zoology represent a total offering of 51 credit hours. These and the availability of a director or consultants for advanced study or research on almost any aspect of field biology provides rich opportunity for the undergraduate or graduate student or independent investigator in biological science.

The enrollment at the Station is not limited to students of the University of Michigan nor to graduate students. Any man or woman with a college transcript showing eight or more semester hours of credit in biological science (biology, botany, zoology) and a record of good grades is eligible for consideration as a student, and persons experienced and active in biological research are invited to apply for admission as independent investigators. Since World War II the Station has been filled essentially to its capacity of 150 enrollees. About 70 per cent of these have been graduate students, 20 per cent undergraduates and 10 per cent independent investigators. About 30 states and foreign countries are represented in the enrollment each year. The Station wishes to serve not only the biologists of the University of Michigan but also any other qualified student of biology who needs its facilities.

The Biological Station is situated about twenty miles south of the Straits of Mackinac. Cheboygan, the freight, express, bus, mail and telegraph address, is 13 miles to the northeast on the New York Central Railroad and U. S. Routes 23 and 27, and Pellston, the telephone and air travel address, is 6 miles to the west on the Pennsylvania Railroad, Capitol Airlines, and U. S. 31. Though the Station fortunately is several miles away from all settlements and towns, Pellston being the nearest town, it is easily accessible by improved roads from the U. S. routes.

The region around the Biological Station is predominately sandy, and is marked by gentle, dune-like ridges and broad flat plains dotted by lakes, bogs and swamps, and crossed by many small streams and several important rivers. Within a radius of twenty-five miles are Lake Michigan, Lake Huron and about thirty inland lakes of various types, ranging in size from a few acres to thirty square miles. Of the inland lakes, Burt, Mullet, Black, Douglas and Crooked are the largest. Douglas Lake has an area of about ten square miles and is characterized by deep clear water and broad sandy beaches, though it has some sandy shoals and some stony points, and shallow water and marl deposits are prevalent in the west and north portions of the lake. Both the beach and the water at the Station are ideal for recreation.

Located in a transition belt between the coniferous forests to the north and the hardwood forests to the south, the Station lies among plant and animal associations characteristic of both zones. Seventy-five years ago the region was covered with magnificent forests of conifers and hardwoods, but all of the virgin conifers and most of the hardwoods have been removed by lumbering, and great areas of land were then ravaged by fire. Much of the better land is now under cultivation, but most of the region still is sparsely occupied by man and contains a high proportion of relatively wild land on which two major types of vegetation are conspicuous. On the better upland soils are mixed hardwood-evergreen forests of maple, beech, yellow birch, hemlock and white pine. Some such stands are in virgin condition, and many are in various recovery stages of second growth. The poorer sandy soils, formerly supporting Norway and white pine, are now largely covered by aspens, but the older of these stands are being succeeded by pines. Areas of special interest to the biologist are the Hartwick Pines, a virgin tract about seventy miles to the south; Wilderness Park, an extensive area about twenty miles to the west, containing many types of topography and vegetation which by having escaped fire for about seventy years has returned almost to the virgin condition; and the sand dunes, some moving and others arrested, along about one hundred miles of the shore of Lake Michigan to the west of the Station.

The great variety of topographic features range from the Great Lakes through inland lakes, rivers and streams, bogs, swamps, flats, ridges and dunes; and from cultivated or abandoned farm lands through cut-over and burned-over forest lands in various stages of recovery, to virgin conditions. These features and conditions and the transitional location of the region provide a wealth of vegetation and animal types which make the area extremely attractive to the ecologist and the systematist interested in almost any special situation or group of organisms. From the region have been recorded more than 100 families, 400 genera and 1,000 species of flowering plants; about 50 species of pteridophytes, 75 species of liverworts and more than 250 species of mosses; 170 genera and 600 species of algae and 150 species of lichens. A wealth of higher fungi, water molds and slime molds is known to be present, but only recently have these become objects of intensive study.

Among the vertebrate animals, 52 species of mammals, 150 of birds, 16 of reptiles, 16 of amphibians and 72 of fishes are known. The larger species of mammals present include muskrat, northern varying hare, woodchuck, raccoon, badger, coyote, red fox, beaver, wild cat, bear and deer. Of the invertebrate animals, sponges, hydra, turbellarians, nematodes, gastrotrichs, bryozoans, and aquatic annelids are abundant. The known mollusks include 71 species of snails, 14 of unionid claims and many sphaerids. Smaller crustaceans are abundant and there are several species each of larger crustaceans, centipedes and millipedes. Insects are plentiful and 23 orders are represented. Spiders are abundant and pseudocorpionids, acarinans, phalangids, and rotifers are common. The protozoons are abundant and diversified, all major groups except those strictly marine being plentiful, and both the free-living and the parasitic forms are easily available. Parasitic helminths, especially the larval stages of trematodes, cestodes and nematodes, are abundant and are easily available from the wealth of host species in the region.

The Station occupies a tract of about 8,850 acres of University-owned land lying between Douglas and Burt Lakes with a frontage of about five miles on Douglas and two miles on Burt Lake. Its buildings occupy a thirty-acre area along the shore of South Fishtail Bay at the southeast border of Douglas Lake. Two streets paralleling the shore and connected by five cross streets give access to all of the buildings, of which there are 141. These include 94 residential and 47 general buildings, 14 of which house 16 adequately furnished and equipped teaching and research laboratories, a spacious and well stocked library, an aquarium building, and an animal house. A suite of photographic rooms, a community dining room, kitchen, store, self-service laundry, clubhouse, warm shower room, toilet buildings, boathouse, garages and other service buildings also are included. Groups of cabins are set apart for men, women, families, faculty and the health service.

Students and investigators live in one-room cabins, usually two or three persons per cabin. Each cabin is equipped with screens, stove, beds, chairs, table, electric lights and minor items of equipment. Blankets, linen, towels and toilet articles are provided by the occupants. Women's quarters and the general social activities are supervised by the Dean of Women. All residents of the Station take meals at the dining hall, which is serviced from a modern electrical kitchen by trained personnel and a professional dietitian. The food service is operated as a community project under the general supervision of a Commissary Committee, and the meals are wholesome and generally regarded as of excellent quality. All members also are protected by the Health Service, with a resident physician and hospital. Modern hospital facilities are available at Cheboygan and Petoskey, 13 and 23 miles distant, respectively. The Station is served by electrical and water distribution systems and a water-borne sewage system. Informal activities such as boating, swimming, leisure on the beach, and hiking along woodland trails; organized activities including soft ball, dancing, amateur theatricals, motion pictures, evening lectures, impromptu participation in ping-pong, cards and other indoor activities in the clubhouse; and organized or informal visits to nearby spots of scenic and historical interest provide adequate recreation.

Study and research facilities beyond those previously described include outdoor ponds, indoor aquaria and animal cages; nets, bags, vascula and other kinds of collecting gear; mechanical, chemical and electrical measuring and recording instruments; glassware, chemicals, stains and preservatives; transits, field glasses, a phase microscope, compound and sterebinocular microscopes; microtomes and other micro-technical apparatus; charts, projectors and audio-visual equipment; extensive museum collections of bird and mammal skins and skeletons, and other preserved vertebrate specimens; insects and other invertebrates preserved dry, wet or on microscope slides; and herbarium collections of flowering plants, grasses, bryophytes and higher fungi. An excellent local stockroom and store promptly can secure most needed items not previously in stock. The Station endeavors to provide all of the usual requirements for study and research; unusual and special items are provided by the user. Transportation of classes and research groups is provided by two launches, outboard motors, and fleets of work boats, row boats, buses, trucks and smaller land vehicles. Ordinary field trips by classes are made without additional cost to the student for transportation or meals.

During its forty-two seasons of operation the Station has enrolled more than 2,500 students and investigators. A large proportion of these are now professional biologists active in research, teaching, practice and administration. While many of its students come for class study only, the research record of the Station is impressive. More than 725 papers based on research at the Station have been published, and in recent years this number is increasing at a rate of about 30 per year. In 1950, the members of the Station were engaged in 92 separate research projects. Of these, 53 were on zoological, 25 on botanical, 9 on forestry, 4 on limnological and 1 on meteorological topics. Of these 92, 39 primarily were faculty, 39 were student, and 9 were independent investigator projects.

A number of factors make the Station an unusually good place for study and research. Among these are the abundant variety of natural habitats and the rich associations of organisms; an excellent climate with a mean summer temperature of 65.8 degrees; excellent conditions for study among others of similar interests; freedom from the intrusion of extraneous interests, the distractions of urban life, and the restrictions of the usual hourly class schedule; opportunity for becoming closely acquainted with a broad group of persons with interests common to yours; meanwhile preserving the advantages of living in comfortable quarters, spending leisure hours in attractive forest and lake-side surroundings, and enjoying excellent food, health service, and planned recreational and scientific lecture programs.

The registration fee for students and independent investigators for the 8-week session (June 23 to August 18 in 1951) is $55.00 for residents and $115.00 for non-residents of Michigan. This fee covers tuition, cabin and health service. The registration fee for dependents is $20.00 for the session, for cabin and health service. Investigators and their dependents may register for a part of the session at the rate of $5.00 health fee for each person plus a weekly charge of $7.00 for Michigan or $14.00 for non-Michigan investigator and $3.00 per week for each dependent. Regular board for adults at the dining room is $120 for the full session or $16.00 per week.

Experienced research workers or students above college sophomore standing with as much as eight hours of credit in biological science courses involving laboratory work and a good transcript record are invited to apply for admission. Accommodations for single men and women and for a smaller number of applicants with families are available. Attendance is restricted to those who secure admission in advance. Applications will be considered, beginning April 15. Early application is desirable to secure admission. Those wishing to attend any session should write, early in the spring of that year to the University of Michigan Biological Station, Ann Arbor, Michigan, for the Announcement bulletin and an application form.

The Teacher's Responsibility

It is a wholesome sign that there has recently been a wide-spread re-examination of college teaching and the role of the teacher. In many institutions increased attention is being given to the training of college teachers and the preparation of graduate students for classroom instruction. Scholarships have been set up especially for students who wish to qualify as teachers rather than as research specialists.

Undoubtedly, this trend has been strengthened by the demand for good teaching in the new type of courses set up under the several programs for general education. The present emphasis on area studies and cultural backgrounds demands more of the teacher than exact knowledge in a very limited field—it requires that the teacher himself be a person of broad interests and wide culture. Much college instruction at the graduate level has for a long time been directed at the training of experts in more and more limited fields. Part of this tendency is due to the ever-widening fields of subject matter, with the consequent inability to master more than a small part of a subject. While the sciences have probably suffered more from this condition, the humanities have also tended to split up into smaller fragments, with research directed into more specialized investigations. As a consequence, the young Ph.D. comes out of college with little preparation for teaching.

We often hear it said that the great teachers are all gone and it is unlikely that we shall find their successors. While this is not quite true, it is obvious that on campuses today there are few great teachers whose influence and fame are conspicuous. Many of these great teachers of the past were scholars as well as teachers — no one would argue that the teacher can dispense with scholarship. But he must have something more—he must be an interesting person himself, and one interested in tasks that teaching brings.

As Professor Highet says, the teacher occupies an unusually significant place in society. This is probably truer today than it has ever been before. Problems now facing the civilized world are of such a nature that they must be analyzed and understood if we are to avoid the calamities of another war. In these significant times, the teacher must do more than impart knowledge in a specific field; he must guide thinking and help to set up standards for action. He must relate the knowledge he imparts to the problems of living and of conduct.

Trying years are ahead. The colleges will be severely taxed to maintain faculties and carry on general studies in the face of insistent demands for specialized and technical training for wartime needs. Such backgrounds are not favorable for the life of the scholar, nor do they make for good and effective teaching. For these reasons, however, the responsibility of the teacher becomes greater, and his task more significant.

MINNESOTA

ITASCA FORESTRY AND BIOLOGICAL STATION

The Biological Station of the University of Minnesota is situated on the east shore of Lake Itasca in Itasca State Park, an area of great historical interest. The source of the Mississippi River is only a mile away. The normal points of entry to Itasca State Park by rail are Park Rapids and Bemidji, some twenty-five miles away. During the Summer Session, a Greyhound Bus Line from the Twin Cities reaches Douglas Lodge on the south end of Lake Itasca, four miles from the Biological Station. Itasca State Park, one of Minnesota's more primitive areas, is located about 225 miles northwest of the Twin Cities. It is seven miles square and covers an area of approximately 32,000 acres. The numerous lakes of all sizes have an area of about 5,000 acres. Lake Itasca, the largest in the park, is 1,460 feet above sea level. Only a short distance away is a continental divide with an elevation of 1,670 feet.

The wooded shores of the lakes, virgin forest, the dense swamps and open bogs, beaver dams, eagle nests, turkey vulture roosts, and prehistoric Indian mounds are features of interest —some of which are accessible over well-marked trails. White, red, and jack pine, white and black spruce, balsam, larch, and white cedar are found in pure and mixed stands of all age classes. The hardwood forests are characterized by such trees as hard and soft maple, white and yellow birch, large- and small-toothed aspen, balm of Gilead, basswood, oaks, elms, and various other species. The variety of forest types and age classes brings about a

Virgin Red Pine with an Understory of Balsam Fir
Note the deer browse-line on the balsam

corresponding variation in the subordinate vegetation. A state forest adjoining the park affords an excellent opportunity to study the ecology of the various floristic and faunistic successions characteristic of cut-over and burned-over lands. The Chippewa National Forest is only twenty miles to the east. This is one of the oldest and best-developed National Forests in the United States. About thirty miles to the west is the old Lake Agassiz basin with its famous Red River Valley wheat lands. Just north of Bemidji lies the Red Lake Indian Reservation. Upper and Lower Red Lake together make one of the largest bodies of fresh water, excepting the Great Lakes, within the boundaries of the United States. The Chippewa Indians operate an extensive fishing industry and maintain a hatchery on Lower Red Lake. The coniferous and hardwood forests adjacent supply timber for the tribe's sawmill on a sustained yield basis. All these features are readily accessible from the Biological Station.

The wealth of flora and fauna makes possible the study of systematic botany, zoology, entomology, parasitology, and mycology through living specimens collected by the student. The abundance of fish, birds, and wild animals in their native habitat offers an unusual laboratory for studying ecology, entomology, parasitology, and wildlife management and conservation.

Instruction

The Biological Station was established for the advancement of fundamental knowledge of terrestrial and fresh-water biology. To this end it promotes and provides opportunity for instruction and research in the various fields of biology. Through these activities it hopes to add to the knowledge of the flora and fauna of the Lake States and midwestern regions of similar geological history.

This Station is conducted cooperatively by various departments of the College of Science, Literature, and the Arts and the College of Agriculture, Forestry, Home Economics, and Veterinary Medicine of the University of Minnesota through the sponsorship of the Summer Session.

It offers elementary and advanced courses in the fields of biology under competent instructors. Opportunities are offered also for independent study and research by more advanced students.

The Biological Station offers unusual educational opportunities to various groups of students.

1. To graduate students in the field of biology it offers an excellent field laboratory for research.
2. To students of wildlife management it offers an opportunity for life history and ecological studies.
3. To high school teachers it offers an opportunity for advanced study and improvement. It will provide the necessary training to enable the teacher to take biology classes to the field.
4. To undergraduate students in all fields of biology it offers an opportunity for advanced instruction. For those who are not certain in which field their major interest lies it can serve as a help in orienting them.
5. To students in agriculture and home economics who contemplate a career in extension work it offers an opportunity for training in conservation and nature study. These subjects are important phases of all rural extension work.
6. To teachers of botany, zoology, and all phases of biology in all schools and colleges it offers an opportunity for improvement through independent research.

Courses consist of field trips and indoor laboratory work. An effort is made to use the field rather than the laboratory as much as is consistent with good instruction. The scholastic standards of the University are maintained at the Station. University credit is given for work satisfactorily completed in the courses for which the student registers.

Facilities for Instruction and Research

The buildings and equipment of the Station, while not elaborate, are adequate for all purposes. Its dormitories and laboratories are located in an attractive forest setting on the shores of Lake Itasca. The new dining hall, located on the lakeshore, has a large

Collecting Specimens for Laboratory Work

assembly room with a fireplace which is used for evening meetings and recreation.

Two new one-story laboratory buildings were constructed in 1946. These buildings provide laboratory space for four subjects. They are well lighted and provided with the necessary tables and chairs, a fine herbarium of the region, insect and fungus collections, bird skins, and small mammal skins for study.

The new limnology laboratory is a two-story structure located on the lakeshore completely equipped with all facilities. The entire camp is electrically lighted with 110-volt AC.

Since the major part of the instruction is in the field, the laboratory equipment is not elaborate. It is adequate, however, for all ordinary purposes, and arrangements can be made to have special equipment available if the needs can be anticipated. The normal equipment includes a library, all necessary compound and dissecting microscopes, binoculars, collecting equipment, various types of nets, rowboats, launches, and a supply of accessories and minor equipment essential for adequate instruction and research.

Arrangements can be made to provide laboratory space for advanced students and research workers. It is desirable to make such arrangements before coming to the Station.

Board and Lodging

Students live in small cabins, each one accommodating eight students. There are six cabins available for men students. A central bathhouse with showers, hot and cold water, and laundry facilities is conveniently located to the men's cabins. Five cabins are available for women students. These cabins are equipped with running cold water

Field Collections Are Studied in the Limnology Laboratory

and toilet facilities. A bathhouse with showers and laundry facilities is located convenient to the women's cabins. The women's cabins are so located that some of them can be assigned to men students if the enrollment of women students is not large enough to require the use of all the cabins. Students are asked to bring their own bed linen, two or three double wool blankets, a pillow, towels, and toilet articles. Nights are often cool, even during the summer. The following personal equipment is essential: suitable shoes or boots for field work, a field suit or dress, a warm jacket, a raincoat, heavy socks, a swimming suit, flashlight, desk lamp, notebooks, pocket field books, pencils, hand lenses, dissecting sets and pins, vials and corks, and the recommended and necessary textbooks. When possible, it is recommended that the student write the instructor to secure information on needed texts and equipment. The Station operates a supply store where standard supplies can be secured. Students are asked not to bring trunks since it is difficult to get them to the Station and there is no room in cabins for storing them.

Meals are served in the new dining hall operated under the direction of the administration of the Station in consultation with officers elected by the attending students. The meals are carefully planned, well balanced, and well prepared by experienced cooks. Fresh meat, vegetables, and fruit are served daily.

It is difficult to indicate what the cost of board will be in these times of rising prices. The cost in recent years has been approximately $55 per student. A payment of $55 to the treasurer of commissary will be required during the first few days of the session.

Should the cost exceed this figure, additional payments may be called for; if there is any balance left it will be refunded to the students.

A charge of $5 will be made to each student for dormitory and dining hall facilities provided, payment to be made to the director during the first week of the session.

Laundry facilities consist of stationary laundry tubs and an electric washing machine in each bathhouse. No electric irons or ironing boards are available. Students are expected to keep their own quarters clean and orderly.

A two-ward, well-equipped infirmary, with a registered nurse in attendance, is available for the care of minor ills and injuries. Medical attention, when necessary, can be secured from Park Rapids or Bemidji. The payment of the incidental fee covers the cost of this service and entitles the student to medical service not to exceed a cost of ten dollars. Special services, such as X ray, infrared treatments, etc., and the cost of filling prescriptions must be paid by the student.

The camp operates with a minimum of rules and regulations. Cars are permitted but no garage space is provided. Weekend absences from camp and extended field trips must be reported. Off the campus the student is governed by the State Park regulations.

Fees and Expenses

The following fees are payable by each registrant on or before July 30:

Tuition fee	$50.00
Incidental fee	7.00
General deposit fee	2.00
Laboratory fee	5.00
Total fees	$64.00

Charges for laboratory breakage, library fines, etc., will be deducted from the $2 deposit and the balance will be refunded by mail after the close of the term.

The estimated cost of $125 includes the $64 registration fee, the $55 for board, and $5 dormitory and dining hall charge. It does not include traveling expenses, laundry, and incidental personal expenses.

Admission and Registration

The courses at the Biological Station are open to all qualified graduate and undergraduate students who have had the usual preliminary courses in biological subjects. The general rules of admission for the Summer Session apply to the Biological Station. Students are advised to consult these regulations in the general *Summer Session Bulletin.*

A reservation is required for attendance at the Biological Station Summer Session. All reservations and inquiries should be addressed to the College Office, University Farm, St. Paul 1, Minnesota, and not to the Office of Admissions and Records or individual departments. *The reservation form is not a registration form.* Its purpose is to provide a check on the number of students expected so that the capacity of the Station will not be exceeded.

Advanced students may take two subjects and in addition one or two credits of a well-delimited research problem.

For the 1951 session, not more than eighty-eight students can be accommodated in residence at the Station. Priority of reservation will govern admission. The number of students living off-campus who can be accommodated is limited only by the facilities available at resorts or camps.

Mail for students registered at this session should be addressed in care of the Biological Station, Douglas Lodge, Minnesota. Attention is called to the fact that the name of the post office is "Douglas Lodge."

Graduate students are permitted to pursue their research problem work under the supervision and guidance of the staff without attending regular classes. Arrangements can be made so that the facilities of the Station are available to this type of student for the entire field season. Such arrangements must be worked out with the director and the instructor involved and each case will be judged separately.

Special arrangements may be made with the director of the Station by qualified independent guest investigators for the use of the facilities of the

Station for research in various fields of terrestrial and fresh-water biology.

Application for admission to the Graduate School should be sent directly to the Dean of the Graduate School, University of Minnesota, Minneapolis 14, Minnesota. Students must make such application at least four weeks before the opening of the Biological Station Summer Session. (See also information under Graduate School in the general *Summer Session Bulletin.)* Attention is called to the fact that pending admission to the Graduate School students can register as adult special students. Credit so earned may be transferred, upon petition, to a graduate record if the student is later admitted to the Graduate School. If the student is not admitted to the Graduate School the credit earned as an adult special student will not be given official validation as graduate credit.

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Broad Education Is Best Education

A university offers many opportunities for developing the ability to think for one's self. Through learning the techniques of marshalling and analyzing facts in many fields, both practical and theoretical, the student develops his powers of thought.

One ability which is especially important to the citizen in these times is the ability to distinguish between fact and fancy, between truthful reports and false propaganda.

This ability is of basic importance to the country as well. In a democratic state decisions must be made by all its citizens, and it is therefore essential that every young person be educated for intelligent participation in government, as well as for the personal enjoyment of life which will make him a contented citizen. The government must be able to depend on the intelligence of its citizens for the development and support of sound policies—policies which they are eager to support and defend because they have helped to formulate them.

Now, as always, the best education is the broadest possible education. Breadth of general training is the best formula for individual resourcefulness, recognition, and success. It is by far the best safeguard for an uncertain future.

No one man any longer can comprehend the whole sweep of human knowledge, although such could be attempted by some of the great minds of earlier centuries. In a university thousands of courses are offered. Since it is true that no man, however brilliant, can master the whole range of learning, it is necessary today to select one's field, and in that sense, at least, to specialize. It is easy to go too far in specialization, however, and the man who is concerned only with his own job often becomes an ineffective and unhappy person, because he has limited capacity for the appreciation and enjoyment of the many good things that lie in other fields.

My conclusion is hopeful. It is this. However new and complicated they may seem, the problems we face as individuals and as a nation can be resolved if we summon intelligence, confidence, breadth of experience, diligence, faith, and sincerity. The uncertainties, the frustrations, the nightmares in a period of approaching war are not the things that kill and defeat us. Limited knowledge and understanding, narrow interest and experience, lack of faith and of vision, these can destroy and conquer.—Dean Stanton C. Crawford, The University of Pittsburgh.

MONTANA
STATE BIOLOGICAL STATION

Limnology laboratory and dock area

The Montana Station is one of the oldest biological stations in the country. It was established in 1899 by Dr. M. J. Elrod through special grants from the United States legislature, and in the early sessions it was accessible only by a combination of stagecoach and lake ferry. Regular sessions were held from the time of establishment through 1920. Because of the lack of funds, formal classwork was suspended from 1920 until 1947, when rehabilitation was begun. Since 1947 the station has expanded until at the present time it possesses a large and extensive physical plant. Four buildings contain eight laboratories, in which regular classes are held. A central building houses the administrative offices, the library, the student store and the recreation rooms. Community meals for all in attendance are served in a modern kitchen and dining room. A centrally located bath-house and latrine provides laundry facilities, hot showers and an ironing room. Students as well as faculty live in cabins, many of which are situated along the lake shore. These cabins are situated in four living centers which segregate married students, faculty, women students, and men students. The caretaker's home, a garage, a shop and an animal house comprise the rest of the major buildings. Transportation, which is normally limited to class work, is supplied by canopied trucks and pick-ups.

The biological station is very unique in its geographic setting. It is located on the east shore of Flathead Lake, an oligotrophic lake which covers an area of 210 square miles, is 35 miles long, and reaches a depth of over 100 meters. Flathead valley is completely surrounded by mountain ranges: The Salish mountains lie to the west; the Whitefish and Flathead mountains can be seen to the north; and the Swan range and the mountains of Glacier National Park are visible to the northeast. Most spectacular of all, the Missions rise precipitously to a height of over 10,000 feet, forming the eastern shore of the lake and extending 50 miles farther south. In this wide geographic area, then, a great variety of habitats in the Hudsonian, Mississippian and Columbian drainages can be

Aquatics class at Kicking Horse Reservoir

Mammalogy class in Glacier National Park — Photo by Sumner Dow

Ornithology students in the Clark Range — Photo by Sumner Dow

reached within a few hours drive from the station.

The regular session extends for eight weeks, from the middle of June to the middle of August, and offers a well-balanced program of course work and recreation. Classes meet for all day, either one or two days a week, depending upon the credit hours. Although some time is spent in the laboratory, most of the work is done in the field. At some time during the summer nearly every class takes at least one overnight trip, on which students camp out and prepare their own meals.

Probably the greatest expense to a student is the cost of transportation to and from Montana. The tuition charge of $50.00 is the same for resident and non-resident students. The board bill is much the same as that of other stations and normally runs from $12 to $15 per week. Cost of books and supplies usually does not exceed $12 for the summer. Thus, total expenditures for the eight-week session need not exceed $180. There are a few opportunities for remunerative work. Some graduate teaching assistantships are available as well as research assistantships in various fields. There is also some opportunity to work by the day and by the hour doing janitor work, truck driving or day labor on the station grounds.

The instructional staff consists of four members of the resident staff of the University and two visiting professors. Enrollment is normally limited to upper class students, graduates and independent investigators, but college sophomores of good standing may petition the Executive Committee for admission. Botany courses offered include Systematic Botany, Aquatic Flowering Plants, Agrostology, Fresh

Water Algae and Bryophytes. A student interested in Zoology may select courses from Ornithology, Limnology, Ichthyology, Mammalogy, Natural History of Invertebrates, Entomology, Aquatic Insects and Limnological Methods. In addition to these regularly scheduled courses a student with adequate background may elect work in a special problems course. Problems can be taken in almost any phase of biology, and many of these problems can be so designed that the results can be published. Instruction and research are facilitated by a power launch, rowboats, outboard motors and the normally required laboratory equipment. In addition to the regular equipment, the station owns such special equipment as the most recent limnological apparatus, all types of fish nets, and live traps for small mammals.

Perhaps one of the greatest advantages of the Montana station is its unlimited research possibilities. Botanical research in this region to date has been almost entirely of the preliminary survey type. The same situation is true in zoology with the possible exception of mammalogy and ornithology. There are excellent opportunities to study geographic, altitudinal and ecological distribution of both plants and animals. Life history studies of the forms of this region are practically unknown.

Of particular interest to some investigators is the fact that certain of the staff members are collaborators with the National Park Service, allowing possibilities of research in Glacier Park. Projects can also be carried out in cooperation with the Montana State University Cooperative Wildlife Research Unit and with the National Bison Range. Because of the close association of the units and staff of the University and the Rocky Mountain Laboratory at Hamilton it is possible for a worker to associate himself with both institutions.

Excellent opportunities are available for recreation and research in the Mission Mountains. Each week of the regular session a hike is conducted on Forest Service or Indian Service trails into a different pass. These trips start out with an easy climb for the first week and get progressively harder throughout the summer. A student, thus, can enjoy sightseeing and mountain climbing and at the same time collect data for studies on the vertical distribution of various biota. The summer is normally climaxed with a post-session pack trip. All investigators, and those students who have demonstrated marked ability in their class work are eligible to participate in this week-long event. This trip is designed to carry out research programs in the primitive areas of the Swan and Mission mountains, and is a fitting climax to an enjoyable academic summer.

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A Voice in the Trees:

After the light, westward the night
Hurries and must!
Scurrying after day, out of the shadows' way one little gust!
Silver that tips the spruce, gold that the skies produce—
Is that their quest?
Such are the dreams that keep men from their troubled sleep,
Journeying west.
On, on, laboring on,
Minutes and winds and man!
Over the pine and the columbine,
Beating west since the world began.
Canyon and hill, answer who will,
Where the world goes!
What does it hope to find, sweet as it left behind,
Cedar and rose.
Striding and brushing by hare-bell or dragon-fly, meadow or crest,
Sunbeam and caravan, great hours and little man,
Journey on west!
On, on, shadow and dawn,
Never return nor fail!
But the souls of men stray back again,
If they ever have trod this trail.

NEW HAMPSHIRE

SUMMER WORK IN MARINE ZOOLOGY

Congreve Hall is one of several modern dormitories on the campus.

The University of New Hampshire is in the historic town of Durham, on the Oyster River (tidal estuary), 10 miles from Portsmouth, in the southeastern corner of the state, about halfway between Boston, Massachusetts and Portland, Maine. The Great Bay, a large tidal estuary of high salinity with over 100 miles of shoreline, lies between Durham and Portsmouth.

The Great Bay region is one of the most picturesque and historic sections of the Granite State. Only a short distance away is the seacoast, with its fine beaches, and the town is within easy driving distance of New Hampshire's famous lakes and mountains.

The Summer School covers the period July 2-August 10, 1951. Among the courses offered in 1951 are:

1. Marine Invertebrate Zoology:—A survey of the major invertebrate groups, with emphasis on the inshore marine fauna. The proximity of Durham to the Ocean, the Isles of Shoals, and the estuarine waters of Great Bay make it possible to collect and to study marine invertebrates in their natural habitats. About one-fourth of the laboratory time will be devoted to field work with emphasis on natural history and ecological relationships. Living material is used in the laboratory whenever possible. 4 or 5 sem. cr. The staff for this course will include Prof. Nathan Riser of Fisk University, and formerly of the Hopkins Marine Station at Pacific Grove, Calif.; Prof. Arthur Humes of Boston University; and Miss Ruth Turner, Assistant Curator

of Molluscs at the Museum of Comparative Zoology at Harvard University.

2. Parasitology: — An introductory course concerned with some of the more important parasites which cause diseases of man and animals. Living materials will be used as far as possible. 4 cr. Prof. Riser, Mr. Albert J. Haley.

3. Zoology Seminar:—Seminar discussions of current zoological literature. 1 cr.

4. Special Problems in Zoology:—Advanced students may elect a special problem, provided that they present a detailed outline of the subject and can furnish adequate proof of their ability to carry it out with the equipment available. 1-4 cr.

Costs:—Tuition fees vary with number of credit hours and residence. The fee for out-of-state students carrying 5 semester credits would be $63.00. Adequate dormitory accommodations are available for all full-time Summer Session students. Students who live in dormitories must register for a normal load (5-7 credits). Room rent for the six-week session will be $27.00 per person in double rooms and $32.00 for single rooms. The University operates modern, well-appointed dining halls. Cafeteria service is provided at moderate rates.

Recreation and Social Activities:—Recreational attractions of great variety have drawn summer students to the University of New Hampshire for many years. The ocean, the White Mountains and the Lakes Region, countless shrines of colonial history, and summer theaters are within easy driving distance. The campus offers many cultural and recreational advantages, among them lectures, concerts, plays, informal dances, picnics, and out-of-doors activities on the tennis and archery courts and those centered about the modern swimming pool.

Marine Biology

Two members of Invertebrate class collecting in tide pools at Hilton Park, Great Bay.

For information regarding courses, address:

Prof. George M. Moore
Department of Zoology
University of New Hampshire
Durham, N. H.

For bulletin showing course credits, time of meetings, costs, etc., address:

Prof. George R. Thomas
Director of Summer School
University of New Hampshire
Durham, N. H.

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Lord Bacon—As a Biologist

Lord Bacon was not only a philosopher, but he was a biologist, as appears from the following: "As for living creatures, it is certain that their vital spirits are a substance compounded of an airy and flamy matter, and although air and flame being free will not mingle, yet bound in by a body that hath some fixing, will." Now and then the inventor of induction reasons by analogy. He says: "As snow and ice holpen, and their cold activated by nitre or salt, will turn water into ice, so it may be it will turn wood or stiff clay into stone." Bacon seems to have been a believer in the transmutation of metals, and solemnly gives a formula for turning silver or copper into gold. He also believed in the transmutation of plants, and had arrived at such a height in entomology that he informed the world that "insects have no blood."

OKLAHOMA

LAKE TEXOMA BIOLOGICAL STATION

The second annual summer session of the University of Oklahoma Biological Station, Lake Texoma, will be held from June 9 to August 4, 1951. The Biological Station is a permanent field station designed and operated to offer opportunities for study and research in ecology and natural history, and those phases of taxonomy, evolution, morphology, and physiology that require extensive study of organisms in their natural habitats. Though located 125 miles from the main campus of the University of Oklahoma, the Biological Station is an instructional and research unit of that institution and subject to the general rules and regulations thereof. It is located on the north shore of the Red River arm of Lake Texoma at the mouth of Buncombe Creek, two miles east of Willis, and 14 miles south of Madill, Marshall County, Oklahoma. From the standpoint of biological study, its central location on the lake is ideal, putting it in close proximity to many types of habitats both terrestrial and aquatic.

Lake Texoma is an impoundment of the Red and Washita rivers, formed by the Denison Dam, built by the U. S. Army Engineer Corps at Denison, Texas. The gates of the dam were first closed in July, 1942, and the reservoir was filled to power pool level (617 feet above sea level) by 1945. The lake at power pool level has a surface area of 93,080 acres, a capacity of 5,715,700 acre feet, and a shoreline of approximately 700 miles. Its drainage basin occupies 38,291 square miles. Since the Red River separates the states of Oklahoma and Texas, the lake is bounded by both states.

The fact that this station is located on a man-made lake (the only station of its type so situated) in an area where there has been little biological investigation, greatly enhances the research opportunities. Lake Taxoma affords unlimited research problems in fishery biology, limnology, aquatic entomology, aquatic botany, and invertebrate zoology. Its large and diverse fish population accompanied by many aquatic or water-haunting birds and mammals offers many opportunities for taxonomists as well as a wide and relatively unexploited field for parasitologists. Several large, well isolated islands in the lake, each occupied by ex-

University of Oklahoma Biological Station, Lake Texoma tensive flora and fauna, including fish, amphibians, reptiles, birds, and mammals, are ideal for population studies. On the largest of these islands are five small lakes or ponds, and several inlets which become isolated from the main lake at times of low water.

Since the lake is primarily for flood control and also used for hydroelectric power, areas of its shoreline are alternately inundated during periods of high water, and exposed by drawdown. The constantly changing environment created by these water fluctuations offers many interesting and vital ecological problems.

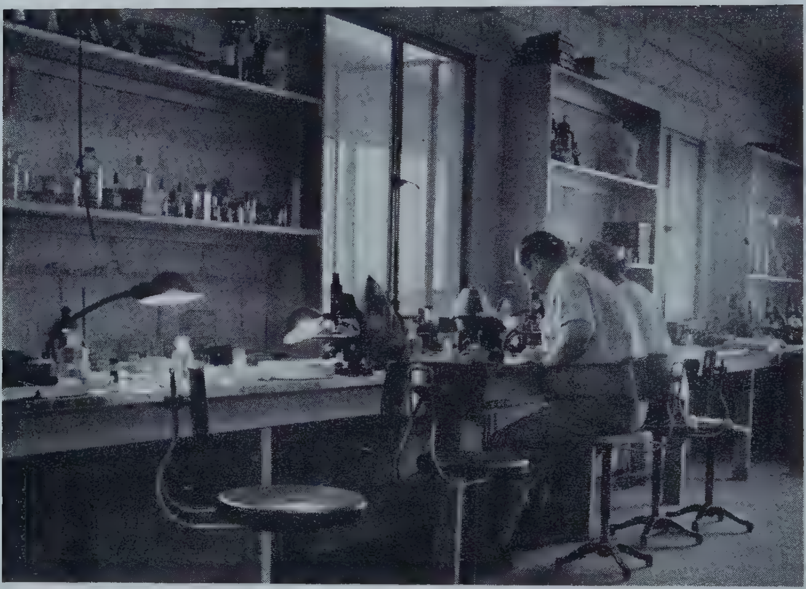
The biotic province in which Lake Texoma and the surrounding region are located is characterized by tall grass prairies and blackjack-post oak forests. Bottom land and flood plain vegetation is found along many of the tributary streams. Low limestone hills covered with sand, clay, loam, or a mixture of these, often with extensive stone outcrops, are abundant as are plains and valleys with similar soil types. Cultivated fields of various crops, eroded areas in beginning to advanced stages, permanent and intermittent streams, farm ponds, and marginal wet lands all abound in the vicinity.

Because of the great variety of both aquatic and terrestrial environmental situations in the region surrounding the Biological Station, opportunities for botanical and zoological study and research are unlimited. It is impossible at the present time to list the number of species of plants and animals that occur in the region. Too little is known. Because of this, research opportunities are unlimited and students can choose problems from an extensive list of possibilities and be assured of interesting and valuable research.

A preliminary study of the lake and its environs during the summer of 1949 revealed many species of plants and animals, both invertebrate and vertebrate, which were new county or even state records. Collections made by both staff members and students during the first summer session of 1950 extended the ranges of many species and added several new records. Approximately 400 species of plants were collected in Marshall County. These collections extended considerably the known ranges of several species within the state. According to available records, one species, *Aristida desmantha*, was added to the state flora. *Sacciolepis striata*, American Cupscale, found on Island No. 2, was reported previously only from Creek County in the northern part of the state. *Ptilimnium capillaceum*, a member of the carrot family, was found just west of the Station and had previously been reported only from Delaware and LeFlore counties, each being a considerable distance from Marshall County. *Boerhaavia erecta*, a common weed in the vicinity of the Station, had previously been reported only from Cleveland County.

The first summer's work on parasites of animals in the region revealed twelve new host and distributional

Field Trip by Boat



Parasitology Laboratory

records, and seven new species records of trematodes and cestodes. It was possible to make studies of only a few of the many hosts species available. Since few parasite studies have been made in the state, opportunities for taxonomic, distributional, and life cycle studies on parasites are practically unlimited.

Several thousand insect specimens were classified representing about 150 families. Numerous inconspicuous forms remain completely unclassified as yet—especially the flies, caddis flies, and beetles. No detailed taxonomic work has yet been undertaken. Among the many groups of invertebrates collected, a small beginning has been made toward a study of the spiders, scorpions, crayfishes, and snails. At present, the insect and invertebrate collections are in a pioneer stage, as yet uncatalogued. To the student, this is not a detriment, but a challenge, since he can find something "new" at every turn and can feel with sincerity that he is contributing to knowledge of the fauna of Oklahoma.

Of the vertebrates, 57 species of fishes, 14 of amphibians, 19 of reptiles, 137 of birds, and 28 of mammals, including beaver and armadillo, were seen or collected and comprise an excellent beginning for the vertebrate faunal list. Many of these were new records for the area.

At the present time the physical plant of the Biological Station consists of one large building. This contains laboratories and accessory rooms, a kitchen and a dining hall, men's and women's dormitories, faculty living quarters, and a library. It can be compared to a main campus biology building with eating and living facilities included. The laboratories are large and well equipped for most types of ecological and taxonomic research. A photographic laboratory and aquarium with indoor and outdoor tanks of varied sizes are provided.

Laboratory equipment includes compound and dissecting microscopes, microtomes, centrigures, drying and preparation ovens, electrical resistance thermometer, spectrophotometer, con-

Fishery Biology Class in Buncombe Creek

ductivity bridge, glassware, chemicals, and many other items.

Field equipment consists of launches, rowboats and outboard motors, cameras, field glasses, collecting equipment, cages and pens, chemistry kits, and much other ecological and limnological equipment.

Biological collections of aquatic and terrestrial plants, parasites, crustacea, insects, and other invertebrate groups, fishes, amphibians, reptiles, birds, and mammals are being made. These collections will be expanded until complete, and students and investigators will be encouraged to add to the collections whenever possible.

With very few exceptions, transportation by boat or truck is furnished without extra cost for all class field trips. The commissary provides meals on such trips. Although field trips usually extend through a half-day or a day, overnight trips are also taken.

The facilities of the University of Oklahoma Biological Station are available to independent investigators during the regular sessions, and at all other times during the year. Faculty members of the Station are available for advice and help on research problems, and consultation with all staff members of the departments of Plant Sciences and Zoological Sciences, at Norman, may be had by correspondence or personal contact.

A sincere attempt has been made to create and maintain adequate and comfortable living conditions. Although often plain and simple, necessary facilities for health and comfort are available. Cats and dogs cannot be kept at the Station, and firearms are prohibited except on written permission by the director.

Students and investigators live in dormitories equipped with running water, electricity, and heat. Showers, lavatories, and toilets are furnished as are beds, lockers or closets, chairs, tables, mirrors, and other minor furnishings. Bedding, such as sheets, pillow cases, and blankets, and toilet articles including towels and wash cloths must be provided by the occupants. The dormitory for women is divided into two- and three-room units. The one for men is a single large unit.

Meals are served cafeteria style in a large dining hall. Board is provided by the commissary and is supervised by the Counselor of Women and the Commissary Committee. Lunches are provided for field trips and certain recreational activities.

Outdoor recreation such as fishing, boating, swimming, softball, hiking, and picnicking is readily available and necessary equipment is furnished. The dining room is used for movies, lectures, music, dancing, and indoor games. A lounge and sundecks are also provided.

A first aid station with facilities for care of minor ailments and injuries is available. A doctor in Madill is on call at all times.

The Counselor of Women for the Station is in charge of the dining room and organized recreation. She also supervises the women's living quarters and is available for advice and counsel.

Private automobiles may be kept at the Station and used subject to liberal regulations. They are useful for private field trips, church going, and town trips. Cover for private automobiles is not provided by the Station. Transportation for all regularly scheduled class field trips is furnished by the Station. A free taxi service is furnished for those arriving by bus or train, but only at time of arrival.

A general fee covering normal laboratory supplies, library, and regular field trips, must be paid at registration by each student. The fee for each regular session at the Biological Station is $32 for all students. Nonresidents must pay an additional fee of $60. There is no reduction in the fee for students registering for less than the full program. The general fee for resident independent investigators is $32 for the full session; for nonresidents, $92. Resident investigators attending for less than the full session must pay a fee of $5 each week; non-residents $10 each week.

The Biological Station Commissary provides board and room at a cost of $110 for the regular session for adults and children over eight years old. The charge is $65 for children 4-8 years old, and $45 for children under four years of age when food for the latter is provided by the commissary. When special diets are required, additional charges may be levied. Dependents of students and investigators must pay a room fee

The Islands

of $12 for the full session or $2 each week if attendance is only part-time. The board and room fee must be deposited at registration. Refunds of the unused part of the fee will be made to those who do not remain for the full session.

A social fee of $1 for each adult and child over 12 years old, and of 50 cents for each child 4-12 years old is collected by the Social Committee at registration. This is to cover the cost of organized entertainment and recreational equipment.

Although at the present time the University of Oklahoma Biological Station curriculum consists of 23 courses (9 formal courses and 14 research courses) it will be expanded considerably within the next few years. At the present time, botany courses offered are: Principles of Plant Ecology, and Identification of Vascula,r Plants taught by Dr. Elroy L. Rice, Assistant Professor of Botany; and Taxonomy and Ecology of the Freshwater Algae, taught by Dr. Elwyn O. Hughes, Assistant Professor Botany. Investigations in Plant Sciences are also offered by these men.

Zoological sciences courses offered are: Parasitology, and Helminthology, taught by Dr. J. Teague Self, Professor of Zoology; Field Entomology, and Natural History of Invertebrates, taught by Dr. Harley P. Brown, Assistant Professor of Zoology; Fishery Biology, taught by Mr. Carl D. Riggs, Assistant Professor of Zoology; and Ornithology, taught by Dr. George M. Sutton, Associate Professor of Zoology. Investigations are offered in the following fields: Invertebrate Zoology, Entomology, Protozoology, Parasitology, Fishery Biology, Ichthyology, and Ornithology.

Dr. Sutton is from the Museum of Zoology, University of Michigan, Ann Arbor, Michigan. The other men are from the University of Oklahoma.

The southwest part of the United States had definitely needed a good biological station for a number of years. We believe the University of Oklahoma Biological Station to be not only the best in the southwest, but also on a par with any in the United States. Within the year, we intend to add additional laboratories, a library, additional housing for faculty and married students with families, and new and more extensive equipment.

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Teaching a Challenge

The problem of college teaching would not be so critical if we were living in a time of relative tranquility and security where incompetence on the part of graduating students could be tolerated with complacence. This is not true today. In our generation, the demands of the occupational world, the challenge of international and domestic problems, and the conflicting pressures upon the individual, all require that our college graduates be much more competent than ever before. Learning cannot be left to chance. And for all but the very able students who can learn without a teacher and the very weak students who will never learn with a teacher—that is, for the vast majority of our young people with normal promise of development—good teaching is fundamental to sound learning.

The rewards that come to the professor who feels himself growing ever more effective in stimulating learning among his students are indeed impressive. One of the most successful of American teachers, William Lyon Phelps, sums up his feeling toward the profession in the following words: "So far from being a dull routine, teaching is to me the most thrilling of professions. It has its perils, its discouragements, its successes, its delights . . . The excitement of teaching comes from the fact that one is teaching a subject one loves to individuals who are worth more than all the money in the world."
—Dean Russell M. Cooper, U. of Minn.

WILDLIFE CONSERVATION STATION

The Wildlife Conservation Station, a unit of the Oklahoma Agricultural and Mechanical College Summer Session, offers advanced courses and research in Biological Sciences. Courses are available in both botany and zoology which serve as background and training for conservation.

The Station is located on a 5,500 acre tract of forest and prairie bordering Greenleaf Lake, Muskogee County, in east central Oklahoma. Greenleaf Lake is a reservoir of 920 surface acres of clear water that has developed into an eutrophic lake with a fauna and flora characteristic of the Southwest. Within a 15-mile radius there are numerous mountain streams, two new large reservoirs, farm ponds and the geologically mature, muddy Arkansas River. The area is so situated that it includes both hardwood forested Ozark hills and tallgrass prairie, thus providing diversified topography, vegetation and animal life. A 33,000 acre tract of land owned by the Game and Fish Department and operated as a public hunting and wildlife preserve area borders the college land on the east, while 23,000 acres belonging to the Soil Conservation Service adjoins the property on the south and north. Thus more than 60,000 acres in one continuous area is provided for study, observation and experimentation.

To the south and east of these public tracts lies a third strikingly different ecological area. The numerous ranges of low mountains receive abundant rainfall and support oak-pine-gum forests. The station location thus provides access to a wider range of ecological conditions than enjoyed by most Biological Stations.

General Living Conditions

The physical plant consists of a part of the hospital installation of the former Camp Gruber. All buildings are frame with asbestos siding and composition roofs, well lighted, screened and ventilated for comfort and safety. Electricity, water and sewers are standard equipment. Quarters, formerly used by officers or nurses, and hospital buildings with private rooms are used for residences. Laboratories are provided with service and research facilities. The College will operate a cafeteria in the area, and provide library facilities for reference and study. Trucks, cars and boats are provided for class field trips.

Board and Lodging

Each room is provided with beds, pillows, mattresses, chairs, tables and minor items of equipment. Blankets, linens, towels and toilet articles must be provided by the occupants.

Board will be provided at the cafeteria under supervision of a dietitian and a camp committee.

The drinking water is provided from a reservoir and is treated in a modern purification plant. The sanitary system includes indoor toilet facilities connected with a modern sewage system and disposal plant. Hot and cold water are available in all quarters.

Class Field Trips

All class field trips are under the supervision of an instructor. Most field trips will be completed in one-half to one day. Transportation is provided by the station trucks and boats in most cases. Meals required for field trips can be provided.

Recreation

The Station area provides exceptional opportunities for hiking, picnicking, boating, swimming, fishing, and softball. A club house is the center of camp indoor activities with card and ping pong tables, soft drinks, candy and cigarettes, and a swimming pool is available in the immediate camp area.

Independent Investigation

Independent investigation is an integral part of the Station. Qualified investigators are encouraged to attend the regular session. The Station will provide rooms, laboratories, general equipment and supplies. The area in which the Station is located offers excellent opportunities for investigations in botany and zoology and wildlife conservation investigators will find a particularly fertile field available for research on deer, furbearers, quail, waterfowl and fish, relative to growth, population, and management studies.

Cost

The entire cost of the session exclusive of traveling expenses and clothing, need not exceed $190.00 for a resident of Oklahoma or $250 for a non-resident.

The Wildlife Conservation Station is a part of the Oklahoma Agricultural and Mechanical College and governmental subsidies to veterans apply at the Station in the same manner as they do on the campus at Stillwater. Veterans that are subject to the G. I. Bill should indicate on the application blank the congressional act under which they will enroll.

Admission and Registration

The Station is coeducational and accepts students who have completed two college laboratory courses in either botany or zoology and whose scholarship is good. Application for admission should be made before April 15. Applications will be considered on April 15, and decisions will be mailed soon after. Late applications will be considered on May 20.

Registration will be held on Saturday, June 9, at the Station. Classwork begins on Monday morning, June 11, and extends through the full period of eight weeks. The examination for each course will be held on its last regular class day.

Credits

Since the Wildlife Conservation Station is a unit of the Oklahoma Agricultural and Mechanical College, credits obtained here are transferable to other institutions of higher learning. All courses numbering 400 or higher carry full graduate credit, and those courses numbered 300 may carry graduate credit on a minor or a major if required by the student's advisory committee. Courses numbered 500 or higher are open only to graduates.

Advanced Degrees

General requirements for the various degrees are stated in the Graduate School Bulletin. Courses completed successfully at the Station will count as residence credit for students who have been admitted to and are registered in the Graduate School of Oklahoma Agricultural and Mechanical College.

Exact requirements for the various degrees vary with the scholastic history of the student. Each case will be considered separately and the course requirements will be determined by the Dean of the Graduate School and an advisory committee representing the department through which the degree is earned. A graduate student is expected to have the equivalent of an undergraduate major in the department in which he expects to earn a higher degree. Master of Science and Doctor of Philosophy degrees are granted in Biological Sciences with fields of concentration in botany, zoology (general), or zoology (wildlife conservation).

Wildlife conservation is under the administration of the Zoology Department and is not a separate department. Close collaboration is maintained with the Botany Department as well as the Oklahoma Cooperative Wildlife Research Unit which is supported by the United States Fish and Wildlife Service, the Oklahoma Game and Fish Department, the Wildlife Management Institute and the Oklahoma Agricultural and Mechanical College.

Description of Courses

As many as 8 semester credit hours may be elected in a given summer session. Each course occupies the entire day assigned to it, and normally requires additional time for preparation and assigned work.

The Station staff is chosen from the botany and zoology departments of Oklahoma Agricultural and Mechanical College and from universities of adjoining states as the demand for additional course work increases. The names of most of the 1951 session members follow.

Amelia M. Baumgartner, A.B., Ph.D., Ornithologist, Stillwater, Oklahoma

Frederick M. Baumgartner, A.B., A. M., Ph.D. Associate Professor of Zoology, Oklahoma A. and M. College

George H. Bick, B.S., Ph.D., Assistant Professor, Tulane University

Henry I. Featherly, B.S., M.S., Ph.D. Professor of Botany and Plant Pathology, Oklahoma A. and M. College

Bryan P. Glass, A.B., M.S., Assistant Professor of Zoology, Oklahoma A. and M. College

Gilford J. Ikenberry, B.S., M.S., Ph. D., Professor of Botany and Plant Pathology, Oklahoma A. and M. College

William H. Irwin, A.B., A.M., Ph.D., Professor of Zoology; Director, Wildlife Conservation; Director, Wildlife Conservation Station; Oklahoma A. and M. College

Edgar M. Leonard, B.S., M.S., Ph.D., Assistant Professor of Zoology, Oklahoma A. and M. College

George A. Moore, B.S., M.S., Ph.D., Professor of Zoology, Oklahoma A. and M. College

Philip E. Smith, B.Ed., M.S., Sc.D., Assistant Professor of Zoology, Oklahoma A. and M. College

Walter P. Taylor, B.S., Ph.D., Professor of Zoology; Leader, Cooperative Wildlife Research Unit, Oklahoma A. and M. College; Biologist, Fish and Wildlife Service, U. S. Department of the Interior

Irvin E. Wallen, B.S., M.S., Ph.D., Assistant Professor of Zoology, Oklahoma A. and M. College

Umaldy T. Waterfall, B.S., M.S., Assistant Professor of Botany and Plant Pathology, Oklahoma A. and M. College

The Wildlife Conservation Station provides students both from local and distant areas an opportunity to enlarge their experience and knowledge of the plants, animals and conditions in the Southwest. Ecology and wildlife conservation are stressed, but fundamental courses in both botany and zoology are used in background and training. There are some fields of study that are particularly opportune in the Station area; among these are limnology, ecology, wildlife management, fisheries biology, plant and animal taxonomy, natural history, and parasitology.

Eastern Oklahoma abounds in opportunities for recreation in hiking, fishing, swimming, and explorong the many hills, streams, caves and limestone outcroppings.

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Students Must Face Fundamental Issues

Although the broad objectives of general and liberal education are probably valid for all, the means of attaining these common outcomes can and should vary greatly from one individual to another. But neither inevitable differences among students nor necessary diversity of instructional instruments can justify disregard of the crucial educational obligations of our time. For by failing to come to grips with the political, economic, social, cultural and moral problems of his society, the student may find himself unable to assume the full rights or to discharge the exacting obligations of free men.

What Sir Walter Moberly recently said of the crisis in the British universities may well be true of our higher institutions, too. He wrote: "Broadly speaking the university today is not asking the really fundamental questions . . . Most students go through our universities without ever having been forced to exercise their minds on the issues that are really momentous. . . . Owing to the prevailing fragmentation of studies, they are not challenged to decide responsibly on a life-purpose or equipped to make such a decision wisely. They are not incited to disentangle and examine critically the assumptions and emotional attitudes underlying the particular studies they pursue, the profession for which they are preparing, the ethical judgments they are accustomed to make, and the political or religious convictions they hold. Fundamentally, they are uneducated."

The things men desire, the moral and ethical principles they hold, the motives which impel their actions are, after all, realities. And they are phenomena of profound significance in shaping individual lives and in molding social relationships, however simple or complex, or however local or global, these associations may be. This is the reason why we should deal with them explicitly.—Inaugural Address, Chancellor T. Raymond McConnell, University of Buffalo.

WASHINGTON

FRIDAY HARBOR OCEANOGRAPHIC LABORATORIES

The Oceanographic Laboratories comprise the main laboratory building on the University of Washington campus in Seattle and the field laboratories at Friday Harbor on San Juan Island in the San Juan Archipelago, about eighty miles from Seattle. The staff of the Laboratories, besides several full-time members, includes professors from other departments of the University (Chemistry, Fisheries, Geology, Meteorology, Microbiology, Physics and Zoology) and occasional visiting professors from other institutions.

The Seattle Laboratories

These laboratories are well equipped for research by graduate students and advanced investigators in the several fields of oceanography throughout the year. The building is on the shore of Lake Union and ready access to the sea is had through the Lake Washington Ship Canal. The building contains a recirculating sea water system which is maintained at 9° - 10°C, the average yearly temperature of the waters of Puget Sound. Further information as to graduate study or research space may be obtained by communication with the Director.

Friday Harbor Laboratories

These field laboratories are on the eastern shore of San Juan Island, one of the largest islands of the San Juan Archipelago. The Archipelago comprises some 175 islands in the northwest section of the State of Washington, lying approximately in latitude 48°N and longitude 123°W. The laboratory grounds occupy a wooded tract of 484 acres with about two miles of shore line.

The buildings consist of six one-story laboratories of concrete and hollow tile, a stock room, a dining and social hall, and various types of living quarters. The campus is situated approximately one and one-half miles from the town of Friday Harbor, the county seat of San Juan County and is reached by ferry from Anacortes.

Facilities for Scientific Work

The Laboratories are admirably located for the study of various phases of oceanography. Within a relatively short distance are sea waters varying from oceanic to those highly diluted by streams, with depths to 300 meters, bottoms varying from mud to rock, and water movements ranging from those of queit bays and lagoons to those of swift tideways. The marine fauna and flora of the region are exceptionally rich. A fifty foot power boat equipped for dredging, net hauls, current measurements, and water sampling is available to those engaged in research and for general class work. Rowboats are accessible at all times at the laboratary dock and floats. The floats are provided with a number of live boxes. A cantilever pier equipped for making various types of observations projects from the shore over water of a maximum depth of 10 meters. A few meters beyond the end of the pier the channel drops to a depth of about 130 meters.

A tidal station is maintained in cooperation with the United States Coast and Geodetic Survey.

All laboratories are equipped with ample electric outlets, gas, fresh water, and sea water approximately the same temperature as that of the adjacent sea. The zoological laboratories are equipped with aquaria. The stock room supplies the usual apparatus and glassware. Compound and dissecting microscopes are furnished. Arrangements may be made for the loan of special apparatus from the several departments of the University. Both research tables and private laboratories are available.

The library contains 5000 volumes and many nautical charts. Additional books or journals may be borrowed from the University of Washington Library through the librarian of the Laboratories. The Library of the University further maintains an interlibrary loan service so that almost any volume is available.

Research accommodations at Friday Harbor other than during the summer session may be made for a limited number of investigators who desire to avail themselves of the facilities of the laboratories throughout the year. Adequate living quarters equipped with oil burner, electricity, and all facilities for housekeeping are obtainable.

Fauna and Flora

The San Juan Archipelago has an exceptionally abundant and varied marine fauna and flora. The area is rich in both phytoplankton and zooplankton. Brown, green, blue-green and red algae are present in quantity. Representatives of all major and most minor phyla of invertebrates are obtainable within a reasonable distance from the laboratory. Shore collecting and dredging in many diverse ecological situations provide an abundance of forms for experimental, morphological, and systematic work.

Marine Biological Preserve

In 1923 the State of Washington created a marine biological preserve which includes all marine waters of San Juan County and some contiguous territory. Collection of biological materials by persons not associated with the Laboratories is thus prohibited by law.

Admission

The summer session of the Laboratories offers (a) independent research, (b) directed research, (c) seminar and formal courses. Application for admission should be made on an application blank obtainable from the laboratories and sent to the Director of the Oceanographic Laboratories, University of Washington, Seattle 5, Washington prior to May 15.

Independent Research

Investigators desiring to work during the summer session will inform the Director of the nature of their proposed research, together with a statement of special conditions and apparatus needed.

Those who desire to work independently, and who have not received their doctorate, should submit the names and addresses of persons who can testify as to their ability to carry on original work.

Directed Research; Seminars; Formal Courses

Requirements for admission are the same for the summer session as for any other session of the University. Students are required to register for at least 12 hours of course work or for one course and 6 hours of research and seminar.

Admission to the University

A student from another institution not currently in residence at the University of Washington must have the registrar of the institution last attended file with the registrar of the University of Washington a complete transcript of his record. Official credentials should be filed with the registrar as far as possible in advance of the opening of the session.

Diplomas or certificates of graduation and personal records of credits which the applicant wishes to have returned to him cannot be accepted as credentials.

Official blanks for transfer of credits earned during the summer will be furnished by the registrar of the University on request to the Director of the Laboratories.

Admission to the Oceanographic Laboratories

Application for admission to the Oceanographic Laboratories at Friday Harbor and all correspondence pertaining thereto should be sent to the Director.

Admission to Graduate Standing

A bachelor's degree or higher degree from a college or university whose standards are equal to those of the University of Washington is required for admission to the Graduate School.

Admission of undergraduate students: The work of the Laboratories during the summer is primarily for graduate students and advanced investigators. Exceptional upper-division students may, however, be admitted to the work of the Laboratories after complying with the above requirements and obtaining the consent of the Director of the Laboratories and professors in charge of the courses in which they desire to register.

All persons desiring to work at the laboratories are required to make formal application.

Expenses for Summer Session
(All fees must be paid in advance)

Tuition Fee	$45.00
Dining Hall Fee	30.00
Quarters per single person	25.00
Board per week	9.10
Stock room tickets, each	3.00

Price of board is subject to change. The tuition fee does not include supplies, breakage, etc.

Research Reservations: Research space in the main laboratories is obtainable by payment of the tuition fee. Several small private laboratories are obtainable for $60.00 for the summer session. Preference as to space will be given to those investigators who arrive on the campus earliest and remain longest. Application for reservations should be made to the Director before May 15, 1951 for the summer of 1951.

Housing Facilities

Cabins equipped with shower, toilet, and facilities for housekeeping are available for family use. Each cabin has two bedrooms, a living room, and a kitchen. Cabins are nicely furnished with beds, mattresses, chairs, table, divan, refrigerator, and oil-burning stove. Ten such cabins are available to members of the staff with families, advanced investigators with families and students with families. Preference is in the order given. Cabins rent for $60.00 per month, rental including heat, electricity, and garbage collection. *Family quarters* comprise a large room with stove and a smaller room. These quarters are of duplex construction. There are no facilities for housekeeping. Central washrooms, toilets and laundry are readily accessible. These quarters rent at $25.00 per summer session per adult person. Quarters are equipped with beds, mattresses and chairs. *Bachelor quarters* are available in five buildings of wooden construction. Each building comprises four rooms, equipped with bed and mattress and accommodates one or two persons. The four rooms open into a central living room equipped with a stove. These quarters rent at $25.00 per person per session. Two of the buildings are for women and three for men. *Tents* capable of housing two persons are available at $12.50 per person for the summer session. A tent for individual occupancy may be had for $20.00 for the summer session. Tents contain beds and mattresses.

It is essential that sufficient blankets and warm clothing be brought. Temperature during the summer session averages approximately 60°F, with extremes rarely departing more than 15° F., from this mean. Rainfall averages about an inch during each of the summer months, and is somewhat heavier in June than in July and August. The low surface temperature of the water, approximately 50°F or the average during the summer, necessitates the use of rubber boots for comfort in collecting specimens. Women find warm slacks and/or jeans the most practicable wearing apparel for general use at the laboratories. Pillows and bedding are not provided in any of the living quarters.

Dining service is maintained from June 15 to August 30. There is a limited number of opportunities for students to wait table in return for their board. Those interested may apply to the Director.

Auto Parking: There are no garages on the grounds, but parking space is provided. Garage facilities are obtainable in the town of Friday Harbor.

WEST VIRGINIA
UNIVERSITY BIOLOGICAL EXPEDITION

The summer of 1951 will mark the twentieth year of the West Virginia University Biological Expedition. The name distinguishes these field courses from older and more elaborate summer curricula which have developed in increasing number during the first half of the century, For the field courses in botany and in zoology conducted by the Expedition are actually explorations into the unknown by students who thus make their first acquaintance with the living world as it really is, rather than as isolated slices ready prepared and served on platters in laboratory and classroom.

Our Biological Expedition has a basic philosophy which led to its establishment in 1926 and which has largely guided it during its development. To Dr. P. D. Strausbaugh, Professor Emeritus of Botany, is due the inspiration which led first to the initiation of a Botanical Expedition and its later enlargement to include the study of both animals and plants. Impressed shortly after he came to West Virginia University by the magnificent field laboratories which lay at hand and by the variety of the flora to be found from the Ohio flood plain to the high ridges of the Appalachians, he gathered a small band of students and set out in the summer of 1926 on the first Expedition. Transportation was by decrepit vehicles, the earth and the trees furnished shelter at night, and the commissary was whatever could be accumulated and prepared over the open camp fire. But to the small group of students who went with him, Dr. Strausbaugh extended the contagion of his own enthusiasm and his own love for the outdoor world and opened new avenues to their hitherto restricted vision.

It was only natural that a course in field zoology should be shortly added to the botany course. Now zoologists and botanists travel and camp together, though sometimes their field excursions take them to different localities. Yet always there is a unification, a very natural drawing together of the animals and the plants that live in communities. Often the botanists get intrigued by a strange animal or by the behavior of a familiar one and often the zoologists are anxious to know something of the plants they encounter. Incidentally therefore a strong appreciation of relationships is developed, and in a much more impressive and lasting way than can result from reading books.

The philosophy of these courses has been compounded of the enthusiasm and interests of the various instructors who have held this view in common—that the field and forest and stream are the best classrooms and laboratories for studying all that is alive in botany and zooloby; that the man who restricts his outlook to the frozen content of textbooks and to the abstractions and distortions of living things that may be seen in laboratory or herbarium is a very incomplete biologist. It was a very wise biologist who said, "A fish out of water is not a fish; it is an anatomical specimen."

While the majority of summer field stations fulfill the needs of specialists and offer a variety of courses, our Biological Expedition has held to more modest aims. Quite presumptuously, however, our instructors have tried to encompass kingdoms rather than orders, classes, or phyla. Anything that lives is our meat. We stop a search for salamanders to study a wasp building her nest; while capturing a snake we may give our attention to a startled bird. If we are studying trees we may pause by the waterside to pick up algae or by a dead log to examine a slime mold. Obviously we do not pretend to be bryologists, herpetologists or specialists of any particular sort, But we are always interested in finding out. What is this animal doing? Why is this plant growing here? Such questions are constantly flashed upon us, and though they may not all be completely answered, they are sure to arouse interest and provoke further investigation.

Such a broad course runs the risk of becoming a series of nature walks like those sometimes conducted for laymen or for Boy Scouts, where a hodge-podge of nature's wonders is presented to provoke surprise and admiration. They are not so, however, for in the shade of a tree or later in the study tent we bring together and discuss the observations we have made. Collections are made, not for their own sake, but for rough or more accurate indentification, depending on our facilities, for classifying, or for further examination. Most of the common species are learned. More important than this, a fair understanding of the inhabitants of various habitats is gained. Finally, very rigid practical and written tests help to prevent these courses from becoming mere recreation. Since we travel about the state and set up camps of about a week's duration we obtain a fair cross section of the flora and fauna of the Appalachian region. From each camp site trips are made into the surrounding country. With field trips often both morning and afternoon, and nights and rainy days for study, much can be done in six weeks. Not the least gain for the student is learning how and where to look for animals and plants of different kinds.

While we do not direct either of our courses toward any particular type of student, we have found them of most value perhaps to the high school teacher of biology, since they make him aware of the vast array of materials that lies within reach of his own school. We believe we have made significant contributions to the teaching of the scores of teachers who have traveled with us and who make up the majority of our groups from year to year. Our own biology majors and biology students from other institutions frequently find our courses admirable introductions to more intensive work in the field. Though it is natural that our courses should attract those who originate in West Virginia, several have come to us from other states from coast to coast.

From very crude beginnings we have been able to improve our physical facilities considerably. A bus furnishes transportation from camp to camp and carries the entire group on the more distant field excursions; for smaller groups and more exploratory trips we have a suburban wagon. Trucks for baggage and camping equipment and a trailer-kitchen complete our caravan. The kitchen is provided with a gas stove and gas refrigerator. Two or three army cots in each of our 9′ x 12′ tents provide sleeping facilities for our staff and students. A 50′ tent furnished with study tables and chairs permits the entire group to work inside while it rains or while the accumulations from the field are assimilated. A small but fairly adequate library is available, though we purposely avoid too great an emphasis on books. The camp site and study tent are illuminated by electricity which we generate ourselves. To set up a field station all we require is sufficient level space, drinking water and bathing facilities.

Although our staff of instruction is small—one botanist and one zoologist —we have always been fortunate in having the services of men who are at home in the field and who, without posing as specialists, can guide the student to profitable outdoor experiences with plants and animals, in other words, to make them also feel at home. In the past we have had with us Drs. J. G. Needham and A. H. Wright, both of Cornell University, but now retired, Dr. Wm. J. Hamilton of Cornell, Dr. A. J. Sharp of the University of Tennessee, Dr. E. Meade McNeill of Concord College and Dr. Earl L. Core of our own staff. Dr. P. D. Strausbaugh conducted the botany course without interruption for several years. In 1951 the botany will be taught by Dr. Herald D. Bennett of West Virginia University, while the zoology will be offered by the writer, who started in 1932 and has continued since, becoming director in 1940.

The itinerant nature of our courses restricts our accommodations to approximately 24 students, which is enough, indeed, for good field work.

The 1951 Expedition will leave Morgantown on June 7 and will return July 17. The two courses are concurrent and contemporary with the first term of the regular Summer Session of West

Virginia University. They are open to graduate students and to undergraduates of junior or senior rank. Students must be regularly admitted to the University through application to the Registrar, who will transmit transcripts of credits to other institutions when it is desired. Anyone who has had beginning or general courses in biology, botany, or zoology is considered to be sufficiently prepared for the work. A credit of six semester hours is given for either course.

Students who are accepted must pay a regular tuition fee of $25.00 for residents (or $35.00 for non-residents) of West Virginia. A maintenance charge of $80.00, which may vary from year to year, is made for food, shelter, and transportation. To insure a place in the Expedition a student is required to make a deposit of $20.00 by May 15.

The Registrar of West Virginia University will send information about admission and a copy of the Summer Session Bulletin on request. Inquiries about the Biological Expedition may be directed to Leland H. Taylor, Department of Biology, West Virginia University, Morgantown, W. Va.

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Liberal Studies Concerned with Man

I think it true without qualification that the sharpest hunger of man is for knowledge of himself. Because this is the greatest hunger of man, the greatest studies are the liberal studies since these are concerned with man: man's relationship to man and to God; his relationship to the good society; and his relationship to his outside environment.

In presenting these studies to you we have split them up more than we should have, and, like a broken vessel, it is now hard to see what man does look like, unless one goes back to look at him from the vantage point of an age before the split occurred. For example, it seems silly to me that a sociologist should not also be an economist, that a political scientist should not also be an historian, that an anthropologist should not also be a psychologist, that literature should be divorced from language, or that philosophy should be divorced from any aspect of knowledge. The German University, in dividing knowledge in order to widen its boundaries, almost defeated the possibility that one could again gain a coherent view of what the various disciplines put together have to say of what man is and how he operates. This means that you will have to do for yourselves what your teachers would perhaps like to do for you but which they are prevented from doing by their special preoccupations. In short, we have been concerned about the verticalness of stretching the boundaries of knowledge, and you are rightly concerned about the horizontalness of learning what is already known and putting it together. It may well be that for the purposes I am describing horizontalness is more important than verticalness. . . .

I have tried to give you a final justification for humane studies. In all the aspects of life which touch us closely the hunger of man is to know more about himself. I have said that you would have to combine the views of several different subjects to gain a coherent picture of man. I have tried to indicate that a theory of man does not suffice, you have to experience the theory to feel it. I have said that knowledge is both extensive, that is, a piling up of learnings about one thing, and it is intensive, or a putting together which focuses on the individual. I have urged that you maintain your individuality, if necessary against the majority, for majorities may be tyrannous. —From Baccalaureate Sermon, by Pres. Byron S. Hollinshead, Coe College.

WYOMING SCIENCE CAMP

The University of Wyoming Science camp is located among the spruce-fir forests of the Medicine Bow Mountains, forty miles west of Laramie, Wyoming, at an elevation of 9,500 feet. The rustic log buildings include the central lodge which contains the recreation hall, study hall, dining room and kitchen; four lecture and laboratory buildings; and cabins for sleeping quarters, each of which accommodates three people. The camp has its own electric plant, bath houses with hot and cold running water, and facilities for those who wish to do their own laundry while at camp. Transportation from Laramie to the camp is provided. A small camp store is operated in the central lodge to supply such wants as candy, stationery, notebooks, ink, maps, and colored pencils.

The Science Camp has been in session each summer since 1925 with the exception of the war years, and the facilities and conveniences have been improved continually. Students from all over the United States, who desired field training or courses in Botany, Zoology, and Geology have been attracted to the Science Camp. Instruction has been carried out by regular staff members of the University of Wyoming, and by members of other institutions.

Advanced Enrollment

Students wishing to enroll in the Science Camp courses should apply for admission to S. H. Knight, Director. Professors L. Floyd Clarke, Zoology; S. H. Knight, Geology; and H. T. Northen, Botany, will be pleased to advise prospective students as to whether their previous training qualifies them for admission to the courses.

Mailing Address and Railroad Connections

Mail to be delivered at the camp should be addressed in care of the University of Wyoming, Science Camp, Centennial, Wyoming. The railroad destination for students attending camp is Laramie. Notification of time of arrival should be sent in advance to S. H. Knight, Laramie, Wyoming, so that arrangements for transportation to the camp can be made. In case transportation is not available at the station at the time of arrival call the University, 4851, extension 205, except on Saturday afternoon or Sunday, at which time call 3129. After 5 P.M. call the Science Camp (long distance, Fox Park 779-F2). Students arriving after 10 P.M. should plan to spend the night in Laramie. The Connor Hotel is recommended.

Research Facilities

The University of Wyoming Science Camp is an ideal base from which the professional research worker may pursue field problems. The Camp is in the heart of the Central Rocky Mountain region, and it is connected by excellent highways with the mountainous areas of Colorado to the south and of Wyoming and Montana to the north. Laboratory space may be procured by making arrangements with the Director well in advance of the expected time of arrival. The only charge is for room and board which is $2.50 per day per person.

Time of Arrival at Camp

Students should plan to be at the camp by 4:00 P. M., June 17. Work begins at 8:00 A. M. on June 18.

Personal Equipment

The daily field trips are conducted at altitudes ranging from 6,000 to 12,000 feet and the student is therefore subject to considerable variations in temperature. Snow lies on the higher portions of the Medicine Bow Range throughout the summer. The days are usually pleasantly warm, and the nights are chilly so suitable clothing is essential. Heavy socks, heavy shoes or boots, flannel shirts, raincoat or slicker, field jacket, hat, warm underclothing and sleeping garments are considered necessary. Bring your own towels and washcloths. All bedding is supplied. For Zoology 645, bring hipwaders, if you have them. Dissecting kits are desirable in Botany and Zoology courses. A 14x Hastings Triplet lens is desirable in Botany.

Costs

Board and room from June 18 to July 21 inclusive, per person—$87.50.

Students arriving before June 18 or remaining after July 21 will be entertained at a rate of $2.50 per day.

Lack of Content under Elective System

Students of liberal colleges during about the first three-quarters of the last century progressed through a required series of Latin and Greek authors and a number of rather dull and formal mathematical, historical and theological text-books. The method of instruction was, in general, "recitation" of the material in the texts: there was much emphasis on rote learning and little on ideas. There was little or no opportunity to do more than perfunctory work in the physical sciences, the social studies or the modern literatures (including English). There was scant atention paid to the student as a personality with a mind of his own. In view of all this one can see how the elective system came as a breath of fresh air.

Nevertheless this older classical curriculum represented a great heritage and idea: the idea that there were certain things all liberally educated men should know whatever their later jobs or professions might be. The very title of the traditional degree—Bachelor of Arts—recalled the *Liberal Arts* (Rhetoric, Dialectic, Grammar, Astronomy, Music, etc.) of Ancient and Medieval times. These arts were "liberal" because they were thought to be genuinely liberating: without them a man, whatever vocational or technical knowledge he might possess, was supposed to be mainly *servile*,—his mind enslaved to his trade, his locality and his pleasures. In particular the Latin and Greek classics were thought of as peculiarly liberating subjects dealing with humanity in a manner both catholic and profound.

For centuries the educated man was the man who knew Aristotle and Plato, Vergil and Horace. If this classical curriculum is looked on not simply as it was taught at the ragged end of its tenure of education but as it had existed over the centuries, one can see that it performed at least two very valuable functions: it preserved the unity and *esprit de corps* of the college-educated class since their education had an identical content in terms of which they could understand and talk to each other; and it exposed this class to fundamental problems that were in some sense at the heart of their civilization and their life. But it had, by 1870, out-lived its great past: it was frankly moribund and, in fact, untrue to itself.

The point we want to make here is that with its loss, went the loss of its *raison d'être*,—the idea of a liberal education consisting of a common core of subjects which all educated men should know because of their intrinsic importance to the business of living. Instead, the adoption of free election—and, later, required specialization in one subject—meant what can only be called a refusal to admit that liberal education had any definite content of that there was any definite subject matter of such intrinsic importance that all educated men should be exposed to it.

The result of this development has long been quite apparent to educators and to the general world. College men ceased to have an intellectual life in common; college men were graduated grosly ignorant of art, or philosophy, or science or literature as the case might be; they became good chemists who were practically illiterate or quasi-authorities on English Literature with little or no appreciation of the physical and social sciences and what they meant in modern life. . . . If college administrators cannot make up their minds as to what ideas are important and what are not, students can hardly be expected to take most ideas seriously.—Hobart and William Smith Colleges Publication, *New Curriculum Number.*

NEW BOOKS

This section offers brief uncritical reports on the general content of recent publications in biological and related fields. For quick location on library shelves, each notice will be preceded, wherever possible, by three groups of numbers, the first two of which will be the Dewey and the Library of Congress classified numbers respectively. The third group is the L.C. card number, for the convenience of Librarians.

ACTIVE CARBON, by John W. Hassler, Chemical Pub. Co., 26 Court St. Brooklyn 2, N. Y., 1951, 384 pp., 34 fig., 31 tables, $7.00.

This text, if we are correctly informed, is the first in English to tackle the problems and possibilities of active carbon. Part one of the book assigns 146 pages to the preparation and properties of absorptive carbon. The next 150 pages are devoted to applications of active carbon to industry, research, public health and gas defense. The third 150 pages treat of experimental methods in the use of active carbon in absorption problems.

ATLAS OF THE CHROMOSOME NUMBERS IN ANIMALS, by Sajira Makino, Iowa State College Press Ames, Iowa, 1951, 290 pp.

QH605.M334 576.3323 51-1602

This second edition of Makino's "Atlas of Chromosome Numbers" was prepared in Japan as a revision of the author's original Japanese edition of 1937. As such, it will probably be new to most Americans in its first U. S. edition. Each page has five columns of information on each species listed. Following the species name, the chromosome numbers are given for the 2n and n complexes; next come remarks if needed, followed by the observer's name and the year. The last column lists the reference quoted. The totals of the forms given run up to 2754 invertebrates and 563 vertebrates, making this probably the most inclusive list yet published.

BACKGROUND OF PLANT ECOLOGY, by Henry S. Conard, Iowa State College Press, Ames, Iowa, 1951, 238 pp.

This translation from the original German of Anton Kerner's "Plant Life of the Danube Basin" is well done. It retains all the colorful language, the poetry and the vitality of the important work on plant ecology which first saw the light of day in 1863. As a classic in the literature of plant sociology, the original remained a closed book,—due to fewness of copies and the monolingual weakness of American education. In presenting this flavorful translation Iowa State College has made all English-speaking botanists its debtors.

BASIC HORTICULTURE, by Victor R. Gardner, The Macmillan Company, 60 Fifth Ave., New York 11, N. Y., 1951, 465 pp., 183 fig., $4.75.

The author who was formerly Director of the Agricultural Experiment Station at Michigan State College has revised his 1941 volume to bring into it the criticisms and suggestions of his associates and friendly users of the original. This book looks good. It reviews elementary botanical principles, then applies them to horticultural practices.

BURDEN OF DISEASES IN THE UNITED STATES, by Alfred E. Cohn and Claire Lingg, The Oxford University Press, 114 Fifth Ave., New York 11, N. Y., 1950, 129 pp., 39 fig., $10.00.

RA407.3.C57 614.15 51-1304

When you unpack this work you will have to look close because you will be tempted to think that you have received two large thin volumes. Closer attention will show you that one is really a full-sized and similarly bound packet containing a sheaf of charts in many and striking colors which may be removed and hung on the wall. This is only part of the exciting freshness of this work. The publishers claim it to be the first produced dealing statistically with the diseases affecting the people of the United States and addressed to the public health officials of the country. Checking it over, we are inclined to think that they have hit the jack pot.

COLLEGE CHEMISTRY, by Linus Pauling, W. H. Freeman & Company, San Francisco, Calif., 1950, 715 pp., 209 ills., $4.50.

QD31.P36 540 50-8314

A chance glimpse into a stray copy of this new college manual piqued this reviewer's curiosity. Here is chemistry made both interesting and intelligible for those biologists not too well prepared or with no previous interest in the subject. No mathematics are used beyond elementary algebra and the ratio method is used in solving problems. There are chapters of unusual clarity on the nature and properties of matter, on atoms, molecules and crystals, at the beginning of the book. At its end are five others which contribute much to its usefulness to biologists. One is a chapter preview of organic chemistry, another on biochemistry, one on the chemistry of silicon, one on energy and chemical changes and last, but by no means least of all, one on nuclear chemistry.

DRAGONS IN AMBER, by Willy Ley, The Viking Press, 18 East 48th St., New York 17, N. Y., 1951, 328 pp., $3.75.

QH81.L67 574 51-9226

Anyone who enjoyed Willy Ley's "The Lungfish, the Dodo and the Unicorn," previously reviewed in these pages, will race to the nearest book store for this new collection of interesting facts about prehistoric, almost extinct, and sporadic adventitious forms in strange places. The articles are grouped under three headings: records in stone, mostly paleontological,—the last of their kind, forms facing extinction,—and wanderers across the planet, migrant forms. The concluding chapter is the most complete and detailed account of the famous Krakatoa Island explosion of 1883 and the subsequent ecological reactions we have ever seen.

ECOLOGY OF ANIMALS, by Charles Elton, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1950, 97 pp., $1.25.

This is one of Methuen's Monographs on Biological Subjects, published in London by the sponsor and agented in the United States by Wiley. The first edition of Elton's work caused some favorable comment when it first appeared seventeen years ago. Covering the fields of ecological surveys, animal interrelationship, habitats, numerical statistics and dynamics, and economic problems, this small work covers a lot of ground authoritatively.

EMIGRATION OF ANIMALS FROM THE SEA, Arthur Sperry Pearse, The Sherwood Press, Box 855, Washington 4, D. C., 1950, 210 pp., 23 fig., $5.00.

QL751.P42 591.52 51-9271

This elegantly printed little book presents a new slant on an old subject in which the revered author is a past master. Anyone of "Doc" Pearse's former students will recall with the pleasant nostalgia the gusto that used to characterize our Professor's presentation of these phases of ecology. Little did some of us know that we were ultimately to see for ourselves some of the places and the animals of which he told us. In this book Dr. Pearse has confined himself only to the animals which move shoreward from the sea.

EVOLUTION EMERGING, by William King Gregory, Two Volumes, The Macmillan Company, 60 Fifth Ave., New York 11, N. Y., 1951, 736 and 1013 pp., over 1000 pp. of ills., $20.00.

Were it not for a few omissions, this rather compendious set of books might just as well have been called "The Encyclopedia of Evolution." Its famous author evidently had other ideas. He has presented here in 1749 pages the summation of his life's work and convictions. The first volume is divided into 559 pages of well organized and sprightly written text, 143 pages of bibliography, an author and a subject index. The second volume has most of its pages devoted entirely to illustrations. These last run anywhere from two or three to a dozen or more and include all the animal types from the primitive protozoa all the way up the variations of the animal world to the anthropoids and man. The evolution of the skeleton monopolizes most of this volume. The plant world is not discussed except in so far as it contributes to the general picture. Neither is much time spent on forms not in the author's conception of the direct line of anthropoid evolution.

FAMILIES OF DICOTYLEDONS, by ALFRED GUNDERSON, The Chronica Botanica Company, Waltham, Mass., (Stubert-Hafner, Inc., 31 E. Tenth St., New York 3, N. Y.) 1950, 237 pp. $4.75.

Since Hutchinson's "Dicotyledons" in his series on the "Families of Flowering Plants" appeared in 1926 nothing of note has been added to our textbooks or manuals specifically devoted to this phase of plant taxonomy. The main discussion is preceded by six special chapters on fossil dicots by Arnold, wood anatomy by Tippo, carpels and ovules by Just, embryology by Copeland, cytotaxonomy by Taylor (J. H.) and plant geography by Camp. The historical notes are valuable, but one of the most practical features is the listing of the chromosome numbers of the genera under each of the family titles.

FLORA OF BIC AND THE GASPE PENINSULA, QUEBEC, by H. J. SCOGGAN, EDMOND CLOUTIER, Controller of Stationery, Ottawa, Ontario, Canada, 1950, 399 pp., 14 ills., 1 map, $1.00.

This Canadian report of the Gaspe Peninsula flora is the most recent to appear in English dealing with those interesting unglaciated areas in which many preglacial arctic plant species are thought to have persisted through the glaciations when much of the rest of the northern continent was ice-covered. The author precedes his taxonomic report with a 38-page discussion of such helpful points as the physical features of the peninsula, its glacial and post glacial history, soil chemical factors, biotic factors, and life forms. The book is paper-bound but those interested will waste little time having it permanently bound.

FROG — ITS REPRODUCTION AND DEVELOPMENT, by ROBERTS RUGH, The Blakiston Company, Philadelphia 5, Pa., 1951, 336 pp., 166 ills., $4.25.

QL669.R84 597.8 51-470

Since T. H. Morgan's famous and well-thumbed "Development of the Frog's Egg" appeared in 1897, there has not been a really new and good book to use in embryology classes, either as text or for reference. A forty-nine page glossary of some 750 embryological terms is a most valuable addition to a manual which has grown out of the experience gained in nineteen years of teaching vertebrate embryology to over five thousand students.

FUNCTIONAL ANATOMY OF THE LIMBS AND BACK, by W. HENRY HOLLINSHEAD, W. B. Saunders Company, West Washington Square, Philadelphia 5, Pa., 1951, 341 pp., 122 fig., $6.00.

QM531.H7 611.9 51-9518

From the Mayo Foundation at Rochester, Minn., comes this practical manual for those whose professional work calls for physical manipulation of the human musculature. Physical therapists, nurses, athletic trainers and masseurs will find it worthy of attention.

FUNDAMENTALS OF HORTICULTURE, by J. B. EDMOND, A. M. MUSSER and F. S. ANDREWS, The Blakiston Company, 1012 Walnut Street, Philadelphia 5, Pa., 502 pp., 149 ills., 30 tables, $5.50.

Used first as a mimeographed text at Clemson Agricultural School and other colleges since 1936, this textbook aims to cover three horticultural student needs: (1) to review fundamental botany, (2) to stimulate the application of those fundamentals to practical field problems and (3) to indoctrinate students with the importance of horticulture in human affairs. Apparently the authors have made good on their aims.

GEOGRAPHY OF THE PACIFIC, edited by **Otis W. Freeman**, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1951, 573 pp., 156 fig., $10.00.

DU29.575 919 51-1109

For those who served at any time in the Southwest Pacific,—in fact any of the Pacific Islands,—during World War II, this may be a dangerous book in the nostalgia it could inspire. For the few who fought and were injured or died on the islands, there were hundreds who spent shorter or longer periods in maintenance and supply. The twelve collaborators who assisted Dr. Freeman in its production have maintained a remarkable uniformity of style so that it appears to be almost the work of one author. If their work is all as accurate as the treatises on Australia, New Guinea and the Philippines, which this reviewer can testify from personal experience, this is indeed a valuable work.

GREAT WHALES, by **Herbert S. Zim**, William Morrow & Company, New York, N. Y., 1951, $2.00.

This item from the list of the Morrow Junior Books which includes other large-print (24 pt.) volumes suitable as gifts to interested and/or inquiring children is mostly beautiful illustrations,—a sort of glorified and intelligent picture book. It should intrigue and educate as well as impart much information that most children not only lack, but do not suspect even exists.

HISTORY OF MEDICINE, by **Henry E. Sigerist**, Volume 1, Primitive and Archaic Medicine, Oxford University Press, 114 Fifth Ave., New York 11, N. Y., 1951, 564 pp., 104 fig., $8.50.

R131.S533 610.9 51-9041

As this series develops it will undoubtedly prove to be the most ambitious collection of facts relating to medical history ever attempted. This particular volume is confined to a general introduction to the whole series and three chapters, one on primitive medicine, one on ancient Egypt, and one on Mesopotamia. The author is research associate in the history of medicine at Yale University. Because of his unique background of research and teaching experience, Dr. Sigerist's works will be a *sine qua non* in all good medical and most biological libraries.

HUMAN PHYSIOLOGY, by **Houssay, Lewis, Orias, Menendez, Hug** and **Leloir**, McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 18, N. Y., 1951, 1118 pp., 499 fig., $14.00.

Under the leadership of the winner of the 1947 Nobel Prize for Medicine, Dr. Bernardo A. Houssay, his colleagues have collaborated in the production of this unusually fine text. The book is impressively large, with its two-columned pages and fifty-three page index, but mere size is no criterion of excellence. Just to thumb through the thousand odd pages is a fascinating introduction to the medical aspects of human functioning. While this book combines in one most of the information to be found in several standard texts and is, therefore, a particularly useful reference, its main appeal is its up-to-the-minute application of endocrine research to the functioning of all parts of the body.

INTRODUCTION TO THE ANATOMY OF SEED PLANTS, by **Ernest L. Stover**, D. C. Heath & Company, 180 Varick St., New York 14, N. Y., 1951, 274 pp., 149 fig., $4.00.

This work takes a logical start from the plant embryo, and follows through the seedling stage to cells and tissue, buds and leaf development, to stem anatomy, vegetative propagation and wood. The chapter on wood and its identification is a honey and the key to common genera of woods of the United States is something new to botanical class book literature as far as this reviewer has been able to discover.

INTRODUCTION TO THE STUDY OF VIRUSES, by **Kenneth M. Smith**, Pitman Publishing Company, 2 West 45th St., New York 19, N. Y., 1950, 106 pp., ills., $2.50.

This little book will fill a very real gap on our library shelves for a compact treatment of those very little understood almost submicroscopic forms known as viruses. It covers their transmission, arthropod relations, physical and chemical properties and serology. There is a chapter on their electron microscopy. The chapter on their control is good.

LABORATORY DESIGN, edited by H. S. COLEMAN, Reinhold Publishing Company, 330 West 42nd St., New York 18, N. Y., 1951, 393 pp., ills., $12.00.

The Committee on Design, Construction and Equipment of Laboratories of the National Research Council herewith report of their activities to date. As such, the book represents no architect's advertising portfolio, nor even the collected results of any one type of building projects. Here there are laboratories for colleges, universities, industrial corporations and research institutions devoted to all sorts of functions. Not only biology, but chemistry, physics, metallurgy, radioactive isotopes, electrochemistry and numerous other activities are here prepared for. In fact, biology has only a minor place in this compendious volume.

LAWN AND GARDEN, edited by E. L. THROM and B. M. KANAMEISHI, Popular Mechanics, 200 E. Ontario St., Chicago 11. Ill., 1951, 176 pp., ills., $2.50.

The full title of these tastefully collected reprints from the Popular Mechanics is "How to Grow the Best Lawn and Garden in Your Neighborhood." It is divided into five parts and a complete index. The parts deal respectively with landscaping, preparing soil, planting, garden maintenance and things to make for outdoor living, such as lawn furniture, outdoor fireplaces, flagstone walks, fences, arbors, trellises, pools, bird houses and window boxes.

LICHENS OF THE STATE OF WISCONSIN, by GRACE E. HOWARD, University of Washington Press, Seattle 5, Wash., 1951, 191 pp., 11 plates, 1 relief map, $3.00.

A paper-bound monograph which supplies a real need as far as the western lichen flora from the moist marine coastal slopes as well as from the eastern highlands and the Columbia River Valley. There is a list of references consulted, a very complete glossary and an index of over 400 titles.

NATIVE ORCHIDS OF NORTH AMERICA, by DONOVAN S. CORRELL, Chronica Botanica Company, Waltham, Mass. (Stechert-Hafner, Inc., 31 East 10th St., New York 3, N. Y.), 1950, 399 pp., 146 pl., many sketches, $7.50.

Botanical libraries anywhere in the United States or Canada will want this book. Chronica Botanica House has good reason to crow over its format, its illustrations and its coverage of the orchid flora of this continent. Sketches, even photographs, of rare and unusual plants are seldom much real help in their identification. This is not true of the many rarely beautiful illustrations with which this book is crowded. It will be a matter of much surprise to most botanists to discover what a wealth of rare beauty is available in least suspected places even in our northern states.

PARASITIC INFECTIONS IN MAN, by HARRY MOST, Columbia University Press, 2960 Broadway, New York 27, N. Y., 1951, 229 pp., $4.50.

The 1949 Symposium of the New York Academy of Medicine was devoted to this subject, and the fourteen papers presented are here reproduced for posterity. As might be expected, three of the papers treat of helminth infections and four present various phases of malarial infections and their treatment.

PLANT GROWTH SUBSTANCES, by FOLKE SKOOG, University of Wisconsin Press, 811 State St., Madison, Wis., 1951, 476 pp., illus., $6.00.

In the centennial year of its foundation, the University of Wisconsin, appropriate to its dedication to the mostly rural people of its constituency, held an extremely high-powered symposium devoted to the plant growth substances. There were 39 papers read. These have been collected and grouped under the following headings: plant growth substances, growth substances in plant metabolism, tissue responses to growth substances, practical applications, substances in vegetative development, substances in reproductive development, pathological growth, vitamins and amino acids as growth factors. The book will be valuable as a summary of research to date, but would have been more serviceable as a reference work if it had an alphabetical index.

THE PRINCIPLES OF HEREDITY, by Laurence H. Snyder, D. C. Heath & Company, 285 Columbus Ave., Boston 16, Mass., 1951, 515 pp., 156 fig., 25 tables, $4.75.

This is the fourth edition in sixteen years of a textbook that is in use in some 250 of the higher educational institutions of the United States. In a day and an age when the sciences move much too fast for any one text to serve more than a four-year generation of students, this revision was imperative. For that reason, as the author intimates, this revised text embodies the latest developments in agriculture, biochemical and radiation genetics, physiological and population genetics, cytogenetics, cytoplasmic inheritance, microorganismal, human and medical genetics.

PUBLIC HEALTH ENGINEERING, Volume 2, by Earl B. Phelps and W. D. Tiedeman, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1950, 213 pp., 35 fig., $4.00.

RA425.P42 614 48-4238 Rev.

This volume in the public engineering manuals devoted to environmental sanitation is devoted entirely to Food Contact. The first volume treats of air and water. This one is easily of most interest to biologists. The book covers food and disease relationships, the production, pasteurization, inspection and control of milk products, shellfish production and control, public eating and drinking places, the handling of refuse and wastes and rodent control.

RADIATION MONITORING IN ATOMIC DEFENSE, by D. E. Gray and J. H. Martens, D. Van Nostrand Company, Inc., 250 Fourth Ave., New York, N. Y., 1951, 122 pp., 19 fig., $2.00.

UF767.G68 539.7 51-9427

The country is being deluged with a spate of new books in the new field of radiological defense. Fourteen of them are critiqued by the authors in the bibliographical appendix to this volume. Biologists who are interested in a preview of monitoring, equipment either for defense or for laboratory use where radioactive substances are in use, would do well to acquaint themselves with this very practical little manual. Its explanations are lucid, not too technical, and the book includes a valuable chapter on future defense monitoring instruments.

RADIOACTIVE TRACER TECHNIQUES, by George K. Schweitzer and Ira B. Whitney, D. Van Nostrand Company, Inc., 250 Fourth Ave., New York 3, N. Y., 1949, 241 pp., 13 fig., $3.25.

QC721.S44 541.38 49.9752

The increasing development of radioactive research and the use of radioisotopes as tracers in all kinds of biological as well as medical experimentation make this a much needed textbook as well as reference manual. It might well serve as a general orientation course manual for radioactivity. The nine chapters run through radioactive hazards, operation, construction and working in a radiolaboratory, basic experiments, chemical, physical and biological experiments.

SOIL AND FRESHWATER NEMATODES, by T. Goodey, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1951, 390 pp., 190 fig., $7.00.

This monograph by the head of the nematology department at the Rothamsted Experimental Station in England represents another important tessera in the grand mosaic of scientific knowledge. Not confined to Britain alone,—in fact most of the forms reported on are found or have close allies in this country,—this work describes soil and freshwater threadworms throughout the world. Marine worms are not included.

SOME BIOLOGICAL EFFECTS OF DITCHING TIDEWATER MARSHES, by W. S. Bourn and C. Cottam, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 1950, 30 pp., 33 fig., including 7 separate maps, 60 cents.

The authors present the evidences for the destruction of wildfire populations as well as the destruction of their food sources in the areas studied. It is well documented and illustrated. Ecologists should be interested.

A SOURCE BOOK IN ANIMAL BIOLOGY, by Thomas S. Hall, McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 18, N. Y., 1951, 716 pp., $10.00.

This work represents the zoological phase of the Source Books in the History of the Sciences Series edited by G. D. Wolcott. This volume is edited by Dr. Thomas S. Hall of Washington University, Saint Louis. The work consists of 119 fairly lengthy passages from original research papers or contributions which have become historically famous. These papers are grouped under eight general headings: the organization of animal life, the activities of the animal organism, the basis of animal behavior, the origin and development of the individual, cellular biology, pathology, evolution and heredity, and zoogeography.

SUBTROPICAL ENTOMOLOGY, by Walter Ebeling, Linotype Process Company, 523 Folsom St., San Francisco 5, Calif., 1950, 747 pp., 570 ills., $7.50.
SB608.F8E23 632.951 50.2603

Printed in typewriter type on high gloss paper, hundreds of photographs as well as sketches and diagrams, thirty-four pages listing 1032 references cited and a twenty-six page index make this substantially bound manual a useful guide, not only to tropical fruit and vegetable crop growers, but also to the students or instructors. Those of us who live in the northern states who know more of snow and sleet will have only an academic interest in the book and value it for its reference usefulness. Those who live and labor in the more [illegible]btropical areas below the Mason and Dixon Line will find the book most practical and useful as well as instructive.

THE VERTEBRATE BODY, by Alfred S. Romer, W. B. Saunders Company, West Washington Square, Philadelphia 5, Pa., 1949, 643 pp., 363 fig., $5.50.
QL805.R65 596 49-5860

From its first appearance this text book found such a hearty welcome that it is almost a work of supererogation to review it at this late date. It has a freshness of approach and treatment that stands out in favorable comparison with all its older and more stereotyped predecessors. Contributing to these desirable traits are the author's inclusion of both histological and paleontological data in judicious proportion; his emphasis, not only on embryological history, but physiological function; and his stress on the comparative aspects of structures. That the book had to be reprinted twice during the past year speaks for itself.

WEEDS, GUARDIANS OF THE SOIL, by Joseph A. Cocannouer, The Devin-Adair Company, 23 East 26th St., New York 10, N. Y., 1950, 179 pp., 22 ills., $2.75.
SB611.C58 632.58 Agr. 50-480

This is a rambling, witty and pleasant discourse, on the utility of the lowly weed. It is undocumented to a large extent, but there is enough workable material here to keep a number of agricultural schools busy for a period of years. The author's thesis that the controlled use of weeds can be sound ecology probably does not need further proving. What it needs is implementation. No one in his right mind could deny the ability of weeds to get deeper into the soil than many of our more "respectable" crops, or that they can help to restore eroded soil, improve its fertility, as well as being tasty and nutritious eating.

SUNDRY PAPERS

Over the editorial desk come a number of publications which serve a very practical purpose and which should normally not be classified as books but which should be called to the attention of those who may be interested in them.

The first of these is a new publication "The Civil Defense Alert" published by the Federal Civil Defense Administration Newsletter for State and Local Civil Defense Staffs, Volume 1, Number 1, April 1951, Washington, D. C. There is no question about it that the most stupid thing we can do in this day and age is to poke our heads in the ground like an ostrich with the old cliche, "It can't happen here." Hitlerian Germay thought itself impregnable and once the border was crossed Germany collapsed. Those who are interested, as everyone should be especially in the biological and first aid aspects of warfare will write to the Federal Defense Administrator to be placed on his mailing list.

The next interesting item recently received is the 1950 "Report of the Minister of Lands and Forests of the Province of Ontario for the fiscal year ending March 31, 1949," printed by order of the Legislative Assembly of Ontario, Toronto. Somehow or other, these Canadian reports get a "rise" out of us, not only because of the tremendous amount of activity they chronicle, but also the,—one might almost say "gorgeous,"—format in which they are produced. Anyone used to some of our American governmental reports with their dull tabulations of unreadable type is almost sure to have his curiosity piqued to the point of wanting to go through these Canadian reports very thoroughly.

The third stack of items recently received is a series of research bulletins beginning with November 1948 and ending with September 1950, which have come to us from the Experiment Station, College of Agriculture, University of Missouri, Columbia, Missouri, of which J. H. Longwell is the Director. Most of these papers have to deal with environmental physiology with special reference to domestic animals. There is quite a series of studies on the "Influence of Temperature, 50° to 105° F., on Milk Production and Feed Consumption in Dairy Cattle," "Blood Composition," "Cardiorespiratory Activities," "Water Consumption" and "Evaporative Cooling" in different brands of dairy cattle, with special attention to Jersey, Holstein and Brahman Cows.

The fourth stack of reprints comes from Mr. E. L. Demmon, Director of the Lake States Forest Experiment Station, U.S.D.A., Forest Service, University Farm, St. Paul 1, Minnesota. This group of reprints is particularly good because it is the last set of publications sent out by Mr. Demmon before leaving the Lake States Station for the Southeastern Forest Experiment Station at Ashville, North Carolina. In addition to his annual report for 1950, there is a whole series of one-page technical notes since January 1951 covering such details as: "Releasing White Pine From Oak and Aspen," "Distribution of Volume in Lake States Trees," "Proper Watering for Young Jack Pines," "Lake States Forest Trees Seed Crop in 1950," "Fence Posts in Minnesota," "Height Growth of Thinned Red Pine," "Improvement of Pine Plantations by Aspen Removal," "Reducing Wood Waste in the Lake States," and "Use of Repellents to Cut Deer Damage."

The Forest Service Report on "Forest Resources of the Lake States Region" by R. N. Cunningham and Staff leaves us with still a lot of things to think about in our modern forestry practice.

Since January 1951 the "Lake States Aspen Report No. 22" on the "Enemies of Aspen" has caused a considerable amount of favorable discussion. It brings together in a compact form a lot of information that would be difficult to find otherwise.

Lake States "Station Paper No. 23 and No. 24 will be of interest to foresters ecologists. No. 23 deals with "Reforestation Research Findings in Northern Wisconsin and Upper Michigan" by J. H. Stoeckeler and G. A. Limstrom. The second paper by F. H. Eyre and F. R. Longwood describes "Reducing Mortality in Old-Growth Northern Hardwoods through Partial Cutting."

EDITORIALS

One of the characteristic questions this office has always had to contend with is the perennial question: "When will "The Biologist" be out?" A bit of free advice that this office most frequently receives is that all copy printed in "The Biologist" should be submitted to the authors in proof for final checking before printing.

Right here is where the whole story of the irresistible force and the immovable object is beautifully exemplified.

Most of the contributors to "The Biologist" are busy people. Like the Editor, practically all of them are connected with educational institutions or engaged in research with very little free time at their command. Such articles as they submit are first carefully proofed by the Editor for chance errors, misspellings, and so forth, before being sent to the printer. At the print shop our good friend Mr. E. W. Milligan, whom all the delegates to the Denver meetings will recall, goes over them equally carefully. Mr. Milligan, we may safely say, without fear of reasonable contradiction, runs one of the most efficient print shops in the United States. Rarely, if ever, does an entire issue of "The Biologist" come from his presses with even so much as a punctuation mark out of place. This is an achievement that deserves some kind of an Oscar.

Having been associated with Mr. Milligan in all the years from 1931-40 and 1946 to date, your Editor takes this occasion not only to thank him and his extraordinary staff but to point with justifiable pride to "The Biologist" as a model scientific production, not so much for its contents,—because they are dependent on the Editor and the contributors,—but for the way in which they are presented. That this is no mere idle boast has been repeatedly testified to by the various authors to whom we occasionally requested Mr. Milligan to send proof. One of these authors whose article appeared in the winter issue of "The Biologist" was kind enough to return his corrected proof very promptly to Mr. Milligan with the following comment: "Page proof on my article . . . is in splendid shape, about as nice and clean as any I have recently examined." If this were a rare statement, Mr. Milligan might be content, but it has been so consistently characteristic of everything that is put out by the W. H. Kistler Company under Mr. Milligan's supervision that the Editor of this publication is withdrawing from future issues of "The Biologist" the promise to send proof to the authors of articles contributed. Here is where our simile of the irresistible force and the immovable object takes priority. To all questions as to what happened to the winter issue of "The Biologist," we can only answer that the authors of some or at least one of the articles did not return proof until April 27. Such being the case, both Mr. Milligan and the W. H. Kistler Company had a lot of set type, which could have been used for other printing contracts, tied up, useless, dependent upon the available time of the author.

The idea of sending proof to authors is, after all, merely a safeguard against printing errors. Authors who contribute clean-cut well-organized copy very frequently tell the printers to do the proofing at the print shop so that they will not lose time in production. When the printer happens to be an expert with a great deal of professional pride in his work, there is no particular reason why authors of articles should not do this. We feel, therefore, that the best interest of all of the Phi Sigma Society will be better served if we give up any attempt to submit author proof and get the magazines out somewhere near schedule time.

The attention of all those who submit or intend to submit articles is called to the directions contained on the inside front cover of each issue of our magazine.

SALT AND SODA

Perhaps the most incongruous place for a publication notice to be called to people's attention would be in these sacred precincts where the Editor speaks to the readers. However, we have some grim realities to face in this country, not the least of which is the treatment needed for certain serious casualties. The Public Health Service of the Federal Security Agency has just put out a folder which can be bought for five cents a copy in lots of less than one hundred or for two cents a copy in orders for more than one hundred from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Its title is "Salt and Soda for Shock in Burns."

Aside from its grim necessity in case air warfare should ever come to this country, the information contained in this eight-sided folder is practical for all cases of major burns. Summed up, the recommendation is to dissolve one level teaspoonful of table salt and one-half teaspoonful of baking soda (bicarbonate of soda) in one quart of cool water. This is to be given to the patient in advance of medical attention in lieu of anything else. If no medical attention is available, the injured person who does not happen to be affected by nausea may be permitted to drink as much as eight or ten quarts, thus avoiding shock, which is defined as "a collapse of the blood circulation with a serious drop in blood pressure, clammy skin covered with cold perspiration and usually faintness and collapse of the individual."

The back of the pamphlet has very practical first aid directions for treatment of burns and scalds before medical attention can be secured.

Induction of Students

If universal military service is accepted as the pattern I want to join with those educators who are urging on the administration that there be provisions by which selective service will defer all those who are today enrolled in our colleges, technical schools, and universities. These men, if they continue in satisfactory standing, might well have their military duty postponed until such time as they shall have completed their work for the degree for which they are now enrolled. The interruption of a college student's education is a serious matter, and while it would be justified, of course, in time of global war, in these days I believe this is an unnecessary handicap to place on one group of our young men. To get the necessary manpower I think the administration would be well advised to dip further into the pool of the eighteen-year-olds next year rather than to call up at once those now in colleges or professional schools. If the eighteen-year-olds are drafted in large numbers after June, there may be but few in our freshman classes next fall. But in the best interests of all our students, it would be better that this should happen, rather than that those who are now freshmen, sophomores, and juniors should have their education interrupted. Likewise in our professional and graduate schools it seems to me important that men should be allowed to complete their work before doing their tour of military duty.

Along some such lines, then, a reasonable plan for partial mobilization can be worked out, namely, a continuing pattern of military service for all physically able, except for the return to college of a small number of each age group for officer and specialist training. The establishment of this general pattern of universal military training and service should be coupled with action to postpone the induction of those now in college or professional schools. Such a total program, I believe, would be in the best interests of all concerned—the Department of Defense, the educators, and above all, the young men themselves.—President Conant, in *Harvard Alumni Bulletin.*

CHAPTER OFFICERS and NEWS

BETA
—University of Michigan, Ann Arbor, Michigan

President—John D. Goodman, Dept. of Zool., Univ., of Mich., Ann Arbor, Mich.

Vice-Pres.—Barbara L. Bowen, Dept. of Botany, Univ. of Mich., Ann Arbor, Mich.

Cor. Sec.—Dana P. Snyder, Museum of Zoology, Univ. of Mich., Ann Arbor, Mich.

Rec. Sec.—Herndon G. Dowling, Museum of Zoology, Univ. of Mich., Ann Arbor, Mich.

Treasurer—Joseph B. Mosteller, Jr., 1043 Olivia St., Ann Arbor, Mich.

Editor—Philip Miner, Dept. of Botany, University of Mich., Ann Arbor, Mich.

EPSILON
—University of Denver, Denver, Colorado

President—Steve J. Grillos, 1903 East 16th Ave., Denver, Colorado.

Vice-Pres.—Benjamin B. LeMaster, 8505 W. 32nd Ave., Denver, Colorado.

Corr. Sec.—Jean Adams, 1800 Monaco Parkway, Denver, Colorado.

Treasurer—Loren S. Ratliff, 143 So. Grove, Denver, Colorado.

Since Epsilon chapter of the Phi Sigma Society has not as yet held elections of new officers, I am able only to send you the list of new initiates. These include the following:

Helen Louise Baker, William Minteer Benight, Torvald Arthur Bertinuson, John Fleck Blaiske, William Alexander Brayans, James Bernard Callahan, Joseph Carl Daniel, Ronald Wayne Emmitt, Nicholas Calvin Keller, Nelson B. Kverno, John Ragnar Ness, Dorothy Cohick Rosenberg, Stanley Gerson Rosenberg, Gwendolyn Schultz, Clare L. Stiverson, William Joseph Taylor, Jona Carl Thaemert, Oliver George Titrud.

ZETA
—University of Wisconsin, Madison, Wisconsin

President—Maurice Futrell, Dept. of Plant Pathology, Univ. of Wis., Madison 6, Wis.

Vice-Pres.—Richard Behrens, Dept. of Agronomy, Univ. of Wis., Madison 6, Wis.

Corr. Sec.—Doris Gnauck, Dept. of Agricultural Ed., Univ. of Wis., Madison 6, Wis.

Rec. Sec.—Martha Durgin, Zoology, 808½ University Ave., Madison, Wis.

Treasurer—William B. Hatcher, Dept. of Agronomy, Univ. if Wis., Madison 6, Wis.

Editor—Arnold E. Denton, Dept. of Biochemistry Univ. of Wis., Madison 6, Wis.

Council Rep.—O. N. Allen, Dept. of Bacteriology, Univ. of Wis., Madison 6, Wis.

Enclosed please find the information requested in your recent letter. The Chapter Officers are the same as listed in the last issue of "The Biologist." Below is the editorial concerning Zeta's activities and news for the past year.

Zeta Chapter opened its yearly meetings with a talk given by Van R. Potter, Professor of Oncology. Prof. Potter spoke on the subject of Chemotherapeutics and Cancer Research. He told of the difficulties which confront the researcher in trying to find ways to combat cancer. Because of the similarity of cancer cells to normal cells, the problems are numerous. The meeting was attended by approximately 250 students and faculty members.

Later in the year talks were given by Prof. L. F. Graber of the Agronomy Department who lectured on the Research History of the University, and A. D. Hasler, Professor of Zoology, who spoke on the subject of Salmon Conservation.

Zeta hopes that these lectures in varied fields will stimulate interest in biological research as well as being of an informative nature.

R. J. Sirney, last year's president, has accepted a position at Oklahoma A. and M. College.

The chapter initiation was held on April 25th with the following program:

Toastmaster Professor L. E. Noland, *Initiation of New Members* Maurice C. Futrell, *Presentation of Certificates* Professor O. N. Allen, *Election of Officers, Address* Dr. A. M. Keefe, National Editor of Phi Sigma and Dean of St. Norbert College.

The first certificate presented went to Dr. Laurence F. Graber, Professor of Agronomy, as Honorary Member. The presentation was made by Dr. R. G. Shands, Zeta '25.

Initiates: David F. Akeley, Asuncion R. Arce, Kenneth A. Auselbrook, John B. Baker, Paul M. Bessey, James R. Bloom, Barbara Blumenfeld, Connally O. Briles, Clifford R. Bryan, Raymond J. Bula, Dorothy H. Evans, Ralph W. Caird, Chester L. Canode, Lester E. Casida, Jr., Jesusa A. Concha, Mary Jane Coryell, Harold J. DeBey, Clifford J. Dennis, Genevieve C. Doyle, Joseph A. Feldman, George P. Fitzgerald, Carrie O. Gibson, Mohit C. Gupta, James E. Halpin, William S. Hillman, Kuell Hinson, Arthur L. Hooker, Jeanne M. Johnson, George W. Keitt, Jr., Conrad E. Kruse, Herman P. Lankelma, Jr., Eugene W. Lewis, Jr., Gerald Litwack, Robert S. Loomis, Leslie M. Lueck, Michael G. Lysenko, Paul G. Mahlberg, Edward Marcus, Elmer H. Marth, Lourdes R. Marquez, Neal McAlpin, Paul R. Middaugh, Ronald N. Miller, Mohammad A. Mohajir, Myron Morris, Delle Natelson, Edward C. Naber, John H. Nelson, Grace Newell, Ethel Niedergange, Mary Belle Pierce, Walter K. Porter, Jr., Narsimha A. Rao, Gordon W. Robertstad, Sam L. Scheinberg, Carl A. Scheel, Jr., Carl S. Schildt, Frank Seto, Mohmoud M. Shihata, Lotus Simon, Douglas Sorenson, Alice G. Stone, Juanita Sumpter, Donald V. Tappan, William E. Tossell, Eleanor R. Turner, Margaret H. Van Alstyne, Robert N. Van Keuren, John C. Viets, Jr., Alice M. Violante, Karna M. Webster, Eva L. Weinreb, Phyllis J. Weisheit, Anna M. Williams, Vicente Zapata-Ortiz.

ETA

—University of Akron,
Akron, Ohio

President—Patricia Waldron, 565 N. Howard, Akron, Ohio.

Vice-Pres.—Barbara Barnes, R. D. 14, Akron, Ohio.

Rec. Sec.—Barbara Price, 754 Noah Ave., Akron, Ohio.

Treasurer—Barbara Barnes.

Council Rep.—John Van Sickle, Biology Dept., Univ. of Akron.

In February, 1950, Walter Dial and Thomas Orihel became active members of Eta Chapter, and four others were pledged.

In June, 1950, new active members were Patricia Waldron, Ralph Johnston and Barbara Price; two others were pledged.

Thirteen students were pledged in February, 1951.

Advanced academic degrees were received by Eta Chapter alumni during the last year as follows: C. Richard Weaver, B.S. 1942 and M.S. at Ohio State University, received the Ph.D. degree in entomology at Ohio State in June, 1950. He is an entomologist at the Ohio Agricultural Station, Wooster, Ohio.

Sergius Mamay, B.S. 1944 and M.S. at Washington University, received his Ph.D. at Washington in the fiield of paleobotany in June, 1950, Mamay then won a John Simon Guggenheim Memorial Fellowship and began work with the noted paleobotanist, Dr. H. Thomas, at Cambridge University in England last fall.

Robert Baker, B.S. 1949, received an M.S. in the department of anatomy at Ohio State University in summer, 1950.

Other activities of Eta Chapter members and alumni: The dissertation of Dr. George Anastos on "The Scutate Ticks, Ixodidae, of Indonesia" has appeared in the Brooklyn Entomological Society publication. He took his B.S. degree at Akron in 1942, M.S. at Harvard in 1947, and Ph.D. at Harvard in 1949. Dr. Anastos is now assistant professor in zoology at Miami University, Ohio.

William Stockton began graduate work at Cornell in the fall of 1950 after working during the summer at the Marine Biological Laboratory, Woods Hole. Lately he started work on a government project conducted by Dr. Ayres at Cornell for the Office of Naval Research.

James Cole and Thomas Orihel began graduate work in oceanography at the University of Washington in the fall of 1950.

At the same time, Frank Bland began his medical course at Northwestern and John Jacob at Ohio State.

Stockton, Cole, Bland and Jacob were our four Phi Sigma officers of 1949-1950.

Dr. Abraham Cantor, faculty member of Eta Chapter, is testing P.V.P. iodine for its value in killing micro-organisms in both treatment and prevention of disease. His technical assistant is Barbara Price, present secretary of Eta Chapter and senior majoring in biology.

"A 'Capacity' Test for Germicidal Action," published in the February, 1951 issue of the journal "Soap and Sanitary Chemicals," was co-authored by Drs. Cantor and Herman Shelanski with technical assistance by Miss Price.

KAPPA

—University of Kansas, Lawrence, Kansas

President—Ivan Shields, Department of Entomology.

Vice President—Jerome Grunt, Department of Anatomy.

Rec. Sec.—Keith Wolfenbarger, Department of Entomology.

Corr. Sec.—Don Ford, Department of Anatomy.

Treasurer—Margaret Brewster, Department of Botany.

Editor—Wendell Showalter, Department of Botany.

The leadership of Roy Peterson as President in the Kappa Chapter has been outstanding throughout the last year. His choice of programs has been varied bringing outstanding speakers from departments of the University of Kansas and Research Institutes in Kansas City, Missouri.

The climax of the year will be shared with our new President, Ivan Shields who has worked with Roy Peterson in selecting the speaker for the Initiation Banquet May 7th. Dr. Lawrence Snyder of Oklahoma University will be the speaker for the honorary societies banquet speaking on the subject of "Genes."

Dr. William C. Young, director of federal supported projects on Endocrinology, spoke to the chapter on "The Thyroid and Reproduction."

Dr. Boyden Crouch of the Department of Physiology, Univ. of Kansas, spoke on the subject of "Yellow Jaundice."

Dr. Dwight Mulford, of the Department of Biochemistry, spoke on the "Work of the National Blood Bank and Fractionation of Human Plasma."

Dr. Carlyle Smith, Assistant Curator of Anthropology in the University of Kansas spoke on "Cultural and Physical Anthropology."

Dr. Willard N. Hayne of the Midwest Research Institute of Kansas City, Missouri, spoke on "Investigation of Possible Anti-Tumor Agents."

Louis Goyette, Ph.D. Candidate in the Department of Botany, who has received a position with the USPH Service in Washington, D. C., spoke on "The Physiology of Dermatophytes."

Dr. M. M. Michelson of the Midwest Research Institute in Kansas City, spoke on "Some Sugar Sources for *Ashby*."

Mrs. Ruth McNair, Professor of Biology, was re-elected by a majority vote to be the faculty sponsor. Mrs. McNair along with Miss Mary Larson, Professor of Parasitology, have been very faithful in attendance and have offered valued information in organization, finances, procedures and policies. Mrs. McNair has not only attended regular meetings but met with the cabinet. She has been well pleased with the interest of the present officers and believes that the attitude of the members toward Phi Sigma is at an all time high.

New Members of the Kappa Chapter, of Phi Sigma are:

Sydney Anderson, Hal G. Bingham, Ralph D. Comer, Paul P. Cook, Kenneth D. Cox, James S. Findley, Edward E. Gilbert, Thomas W. Haines, John L. Howieson, Lloyd L. Hult, John D. Lattin, Anthony J. Luzzio, Edwin P. Martin, Nora M. Mason, Moselio Schaechter, Lorraine L. Seibert, William B. Stallcup, George Truffelli, Dr. Edward A. Van Eck, Dr. John A. Weir, Howard O. Wright, Katsuyuki Yokoyama.

LAMBDA

—Montana State University, Missoula, Montana

President—Robert Murray.

Vice-President—Charles Waterman.

Secretary-Treasurer—Lyle Shoemaker.

Corr. Sec.—Robert Campbell.

Editor—Robert Campbell.

NU

—Washington and Jefferson College, Washington, Pennsylvania

President—Robert William Kellermeyer, 333 E. Beau St., Washington, Pa.

Vice-Pres.—Burton Sander Benovitz, 298 E. Beau St., Washington, Pa.

Corr. Sec.—Lawerence Thomas Ritchie, Duncan Ave., Washington, Pa.

Treasurer—John Newton Sourbeer, 150 E. Maiden St., Washington, Pa.

Editor—Paul Cooper, 237 E. Beau St., Washington, Pa.

Council Rep.—Dr. C. D. Dieter, Biology Dept., Wash. & Jeff. College.

PI

—Emory University, Emory, Georgia

President—William Dixon Ivey.

Vice-Pres.—Joseph Martin Good, Jr.

Corr. Sec.—Alice Flournoy.

Rec. Sec.—Zona Clyde Bennett.

Treasurer—Adrian Clyde Davis.

Editor—Katherine Warren Loemker.

In October we had a lecture, "The Effect of Vitamins on the Growth of Ringworm Fungi," by Dr. Lucille George of the Mycology Laboratory at the Communicable Disease Center, Chamblee, Georgia. In January we had initiation of new members and banquet with a lecture on "The Growth Hormones of the Anterior Pituitary" by Dr. Wilhelmi of the Biochemistry Department of the Emory University Medical School. New members: James E. Bleckley, Dr. William D. Burbanck, George R. Cary, Jr., William C. Cook, Jr., Kathren Freeman, James Lee Guest, Prentis Baker Huff, Paul Alan Lavietes, Walter A. Rees, David B. Sargent, Jr., Alfred H. Randall, Jr., Thomas Tidmore. On April 5 we held the election of new members (not yet initiated). On April 13 we helped with the open house for the new Biology Building. On April 27 we participated in a Science Night in connection with the Georgia Junior Academy of Science.

RHO

—University of Illinois, Urbana, Illinois

President—James M. Barrett; 345 Natural History Bldg., U. of Ill., Urbana.

Vice-Pres.—William H. Pfander, 108 Genetics Bldg., U. of Ill., Urbana, Ill.

Corr. Sec.—Wayne R. Thornburg, 1118 W. John St., Champaign, Ill.

Treasurer—Alfred S. C. Ling, 404 Natural History Bldg., U. of Ill.

Editor—Mark H. Bert, 555 Davenport Hall, U. of Ill.

Council Rep.—Prof. Norman Levine, 219 Veterinary Research Center, U. of Ill.

As a result of good publicity, the attendance to our lectures has been quite satisfactory. The lecture on Biological Warfare drew about 290 persons. Other lectures were attended by between 50 and 30 people. Our Secretary keeps record of these attendances, but I do not want to delay this letter by asking our Secretary for this exact information. Many of our Chapter members think that our Chapter has been running more effectively than in several previous years. There is plenty of enthusiasm among our Chapter Officers and members.

Herewith is a list of our initiates during last year, arranged alphabetically.

The winner of the competition for the Phi Sigma Research Award at the University of Illinois this year is: Full name: Mr. Johnny Wryas Pendleton (Johnny is not a 'nick-name'). Home town address: Hillsboro, Tenn. Title of paper: "Effect of Different Oat Spacings on Growth and Yield of Oats and Red Clover."

Since it is the practice of the University of Illinois not to confer "outside" awards on Honors Day or at graduation exercises, we have been presenting the award at our spring initiation banquet each year. The banquet this year will be held on May 9th. We would appreciate receiving the certificate by that date.

Since we have had so few (none last year, one the year before) undergraduates submitting research reports, we opened the competition to both undergraduates and graduates this year, a single award to be made together with a monetary consideration of $25.

Toru Arisumi, Derwood McVey Baird, Kendall Wayne Barbee, Ronald

Arly Bergman, William Adam Boyd, Ralph Nathan Bransky, Garwood A. Braun, Gerald Brody, Thelma Brooks, Mary Katherine Brown, Robt. Taylor Calef, Glenna J. Corley, Milton Bruce Davis, Theodore Delevoryas, Paul F. Doolin, Irwin Lester Firschein, Thomas Mason Folkerts, Theodore Bulkley Ford, Merton Hirsch Friedman, Paul Oliver Fromm, Vincent Gallicchio, Mary Virginia Gardner, George Garoian, James Harold Gilford, Richard Aaron Greenberg, Julius Sidney Greenstein, Edward F. Harrison, Elmer William Hartsook, Robt. Fredrick Harwood, Robt. William Hull, Kenneth William Keane, Russell John Jessen, Theodore Matthew King, Julius William Kling, Franklin Charles Lane, Marvin Legator, Norman Lewis Levin, Robt. William Lichtwardt, Mei Lin, James Carl List, Jerome Clement Lyons, Bernard Malin, Venkata Chalam Metta, Ward Wilfred Moore, Eleanor Jeanne Morgan, Charles Albert McLaughlin, Stuart Allan Narron, Thomas William Nielsen, U. Rao Nutulapaty, Marion Helena Nyholm, Johnny Wryas Pendleton, Quentin Harvey Pickering, Myroslow Purko, James D. Ray, Richard L. Raymond, Norman Gilbert Roth, Marcos Boris Rotman, Harrison August Ruehe, Martin Sacks, Bernard Phillip Sagik, Harold Eugene Schendel, Norman J. Siderius, John Titus Sime, Mary Grace Somers, William Franklin Spencer, John A. Stern, Richard George Van Gelder Arthur Adelbert Wagner, Morton Benjamin Waitzman, Theresa Julia Walkowiak, Harold Rillin Wanless, Matthew John Wayner, Jr., Henry Floyd Yarbrough.

SIGMA
—University of Florida, Gainesville, Florida

President—James R. Christie, 1806 N. W. 2nd Ave., Gainesville, Florida.
Vice-Pres.—T. O. Meade, Apt. 217-D, Flavet 3, Gainesville, Florida.
Corr. Sec.—T. H. Jacoway, Apt. 220-R Flavet 3, Gainesville, Florida.
Rec. Sec.—Johanna Glacy, 112 N. W. 16th St., Gainesville, Florida.
Treasurer—Berle J. Shimel, 1025½ W. Univ. Ave., Gainesville, Florida.
Editor—Charles W. James, Georgia Seagle Hall, W. Univ. Ave., Gainesville, Florida.
Council Rep.—Dr. P. H. Senn, Agronomy Dept., College of Agriculture.

UPSILON
—Miami University, Oxford, Ohio

President—Walter Roehl, Phi Tau House, Oxford, Ohio.
Vice-Pres.—Jim Liles, Box 23, Stoddard Hall, Oxford, Ohio.
Corr. Sec.—Irene Bescherner, 246 Hamilton Hall, Oxford, Ohio.
Rec. Sec.—Mike Linn, 216 South Beech St., Oxford, Ohio.
Treasurer—Miles Donaldson, 115 North Popular, Oxford, Ohio.

PHI
—University of New Hampshire, Durham, New Hampshire

President—A. James Haley, Zoology Dept., University of N. H., Durham, N. H.
Vice-Pres.—Donald Bent, 32 Bagdad Road, Durham, N. H.
Corr. Sec.—Elizabeth Eastman, South Congreve, Durham, N. H.
Rec. Sec.—Mary Ann Bruce, H-6 College Road, Durham, N. H.
Treasurer—Ralph Jones, 32 Bagdad Road, Durham, N. H.
Council Rep.—Prof. C. F. Jackson, Nesmith Hall, Durham, New Hampshire.

At the last meeting of Phi Sigma, Beatrice Newell was elected to fill the office of Corresponding Secretary which was vacated by Doris Bane.

Phi Chapter has been busily planning their annual banquet which is to be held on May 7. It is expected to be a great success.

At one of our recent meetings we heard several very informal talks by graduate students on their research problems.

Another program included movies and a talk on Liberia by one of our members.

For the future we have, in addition to our banquet plans, several field trips to Passaconaway, and a beach party to end the semester.

CHI
—Montana State College, Bozeman, Montana

President—Richard H. Smith, 811 S. Willson, Boseman, Montana.

Vice-Pres.—Billie J. Morrison, Quad C, Montana State College, Boseman, Montana.
Corr. Sec.—Louise Carle, 204 S. 3rd, Boseman, Montana.
Rec. Sec.—Thomas E. Furman, 221 S. 5th, Bozeman, Montana.
Treasurer—William Alvord, 822 S. 9th, Bozeman, Montana.
Editor—Shirley Northam, 1119 S. 5th, Bozeman, Montana.

PSI
—University of Washington, Seattle, Washington

President—Lloyd Witter, Microbiology Dept., Univ. of Wash., Seattle, Wash.
Vice-Pres.—Paul Ashworth, Botany Dept., Univ. of Wash.
Corr. Sec.—Jean Julian, Zoology Dept., Univ. of Wash.
Rec. Sec.—Gertrude Horn, Zoology Dept., Univ. of Wash.
Treasurer — Robert Hayes, Zoology Dept., Univ. of Wash.

OMEGA
—University of Oklahoma, Norman, Oklahoma

President—Chris Johnson, Dept. of Zoology, Univ. of Okla., Norman, Oklahoma.
Vice-President—J. Louis Bouchard, Dept. of Zoology, Univ. of Okla., Norman, Oklahoma.
Secretary—James E. Greer, Dept. of Botany, Univ. of Okla., Norman, Oklahoma.
Corr. Sec.—William C. Latta, Woodrow Wilson Center, Box 481, Norman, Oklahoma.
Treasurer—Leslie L. Ellis, 1921 Oklahoma, Norman, Oklahoma.
Editor—Jack B. Bresler, Dept. of Zoology, Univ. of Okla., Norman, Oklahoma.

At the close of the half century, 1950, the report from Omega Chapter, University of Oklahoma, is excellent and in good order. The fall semester here set an energetic pace from the very start. Meetings were held every two weeks with alternating business discussions and pleasure meetings. Our attendance was very healthy considering the sharp competition resulting from several ranking societies and very excellent seminars presented on this campus.

I think it would be appropriate at this point to mention that the refreshments offered at each and every meeting were certainly appetizing and in fine variation. Those wives of our members who added that certain touch to the coffee and other items are to be highly commended for their pleasing culinary artistry. In order to avoid misunderstanding, it is necessary to explain that our speakers were of the highest quality and most entertaining but on highly competitive nights with other societies, our attendance was certainly not to be deplored.

Our council representative and retiring Chancellor, Dr. A. I. Ortenburger, gave an inspiring talk to our chapter shortly before the national convention at Denver. Bob Coalson, our representative brought home to us a most welcome and encouraging report of a fine and successful national convention. A colorful and highly entertaining feature in our speaker series, was the report given by Dr. Howard P. Clemens on "Oklahoma Lakes and The Use of Rotenone in Fish Population Studies." The collection of beautiful kodachrome slides presented proved Dr. Clemens to be a highly efficient photographer as well as an excellent professor of limnology. Several of our graduate students presented some fine lectures of their work and special problems. This was probably most interesting to the undergraduates who were most appreciative of these informative discussions.

The advent of the new year, 1951, brought a momentary lull in our activity. This was soon replaced by the fresh impetus of the second semester in our school year. At the present, we now have forty-three active student members and twenty-six active faculty members. Our largest increase in membership has taken place since 1940. The total membership of this chapter since 1928, however, stands at three hundred and fifty eight, a point of which we rightfully feel proud.

Officers for the new year were elected March 21, 1951 and installed on March 28, 1951. Plans were laid at the latter date for initiation of fifteen new students on April 25, 1951. A banquet will be held following initiation in honor of the new members. The speaker will be Dr. Carl R. Doering, professor of biostatistics, from the school of public health.

On December 17, 1950, Omega chapter passed another milestone with the initiation of its first negro member, Henry Lee Parker, of Oklahoma City, Oklahoma. We are proud and happy to have him with us.

Several of our graduate students are now engaged in radio-active research. Primarily, the work being done is on the effect of such activity in living tissue. Other projects from reptiles to parasites are also being pursued with vigor and we are anxiously awaiting their reports.

A great deal of research, now in the planning and incubating stage, will be initiated this summer at the new University of Oklahoma Biological Lake Station at Lake Texoma. For further information in this field, it is recommended that the reader consult the present issue of the BIOLOGIST, devoted to lake stations throughout the United States, or contact by mail, Dr. Carl D. Riggs, Dept. of Zoology, University of Oklahoma, Norman, Oklahoma.

The following new members were elected and initiated, December 17, 1950:

Edward P. Basler, Jr., Jack B. Bresler, Dorothy Clark, James F. L. Connell, Anita Eischeid, Leslie L. Ellis, Bernard Guenther, Edward John Hinman, Jack Hudspeth, Irving Klein, William C. Latta, Florence Ling, Pearl Mackler, Robert Gilmore McKinnell, Clifford E. Murphy, Henry Lee Parker, Homer T. Russell, Neldagae Smith, Kenneth Starks, Betty Rhea Stine, H. F. Timmons.

ALPHA BETA

—Mount Union College, Alliance, Ohio.

President—James F. Weaver, 344-23rd N. W., Canton, Ohio.

Vice-Pres.—Harold E. Shafer, 1414 E. State St., Salem, Ohio.

Corr. Sec.—Pauline A. Rankin, 720 Columbia St., Leetonia, Ohio.

Treasurer—Robert G. Carter, Alderson, West Virginia.

Editor—Jane E. Douglass, 1504 Versailles Ave., McKeesport, Pa.

Sponsors—Professor O. H. Engle, 1404 Robinwood Road, Alliance, Ohio. Dr. A. V. Hunninen, 1303 Electric Boulevard, Alliance, Ohio.

October 12, 1950, Dr. P. L. Harris, M.D., County Health Commissioner, Subject: Public Health. November 9, 1950, Dr. Scott Hill, M.D., Surgeon; subject: Socialized Medicine in England and Present U. S. Plans. Meeting held in Biology Laboratory in Science Hall. December 14, 1950, Christmas Party. Meeting held in Biology Laboratory in Science Hall. February 8, 1951, Dr. Robert L. Graham, M.D., Pediatrician; subject: Pediatrics. March 8, 1951, Dinner for actives and new initiates at the Raven Restaurant; speaker: Dr. Homer V. Weaver, M.D., Eye, Ear, Nose, and Throat Specialist. April 12, 1951, Dr. Max Shaweker, M.D., Pathologist; subject: Pathology.

We have initiated the following during the past year: December: Richard Brown, Patricia Clarke, Robert Clunk, Peter Homik, Fred Jameson, Richard Masters, Duane McCarty, David Ott, Ruth Schuh, John Weaver, Jacquelyn Wiser; April: Tae Wei Chu, Sarah Jane Cartwright, Mat Blango, Paul Aldendorfer, Robert Higgins, Marian Jackson, Martha Kuntzleman, Roderick King, Blanchard Lewis, John Plegge, John Pohjala, Irene Stock, Mary Jane Williams.

ALPHA EPSILON

—University of Pittsburgh, Pittsburgh, Pennsylvania

President—Richard T. Hartman, 543 S. Graham St., Pittsburgh 32, Pa.

Vice-Pres—Joseph Gennaro, 349 S. Ai-Ken Ave., Pittsburgh 6, Pa.

Corr. Sec.—Irene M. Boccella, 6107 Alder St., Pittsburgh 6, Pa.

Rec. Sec.—Mary Glyde Marsh, 4701 Wallingford St., Pittsburgh 13, Pa.

Treasurer—Dorothy Long, Fairfax Apts., Pittsburgh 13, Pa.

Council Rep.—Dr. Peter Gray, Dept. of Biological Sciences, Univ. of Pittsburgh, Pittsburgh, Pa.

ALPHA ETA

—Oklahoma A. & M., Stillwater, Oklahoma.

President—Glen C. Clefiseh, 102 Sunset, Stillwater, Oklahoma.

Vice-Pres.—Frank R. Benton, Box 997, Vet. Village, Stillwater, Okla.

Corr. Sec.—Henry C. Doan, 310½ Lincoln, Stillwater, Okla.

Treasurer—Estes E. Firestone, 914 Carter, Stillwater, Okla.
Editor—Darwin A. Butholo, Dept. of Bacteriology, Okla. A. & M.
Council Rep.—C. H. McElroy, 310 Life Sciences, Okla. A. & M.

ALPHA IOTA
—Bucknell University, Lewisburg, Pennsylvania.

President—John Shoener.
Vice-Pres.—Joan Hoshauer.
Corr. Sec. Treasurer—Clarence Jaggard.
Council Rep.—Dr. Hulda Magalhaes, Bucknell University.

New members are not taken directly into our chapter. They are accepted as pledges, and they must work out a research problem for presentation to the Society before they become eligible for activation. Therefore, our meetings are taken up by student papers, and we usually do not have other speakers. Further, we hold initiation late in May to give the pledges ample opportunity to complete their work. This year's pledge class is listed below:

Mary Adams, Richard Brooks, Ann Buswell, Robert Carman, John Coates, Janice Crider, Roy Cunningham, Vertie Daggs, Arthur DiNicola, Nancy Field, Mary Fritz, Margaret Garrett, Peggy Hazard, Winifred Hodgson,, Curtis Ivey, Jeanne Jaques, Donald Koehler, Alex Krawczun, Doris Lawrence, Myra May, Harold Miller, Ronald Peterson, Jerome Poulliott, William Pison, Mary Rice, Leonard Salines, Edward Schaeffer, Drew Seibert, Norman Smith, Suzanne Snyder, Marcus Stephanides, Joseph Tomlin, Robert Vanderlin, Edward Waddell, Eleanor Welsh, Stanley Wharton, Sidney Wishnoff, Robert Yackel.

ALPHA KAPPA
—Hunter College New York City

President—Irene Rollman, 23 Vermilyea Ave., New York 34, N. Y.
Vice-Pres.—Sarah Kardesch, 3018 Holland Ave., Bronx 67, New York.
Rec. Sec.—Violet Niesler, 3110 Fairfield Ave., Bronx 63, New York.
Treasurer—Gertrude Ritter, 328 E. 236 St., Bronx 70, New York.
Council Rep.—Dr. Harold N. Clum, Biology Dept., Hunter College, 695 Park Ave., New York, N. Y.

ALPHA LAMBDA
—University of Utah, Salt Lake City, Utah

President—Richard B. Selander, 336 West 2nd North, Salt Lake City, Utah.
Vice-Pres.—Burke H. Judd, 1223 East 3rd South, Salt Lake City, Utah.
Corr. Sec.—Richard M. Hansen, 367 Alpha St. No. 10, Salt Lake City, Utah.
Rec. Sec.—Garn T. Stanworth, 368 Beta St., Salt Lake City, Utah.
Treasurer—James L. Moore, 2762 West 5400 South, Murray, Utah.
Editor—Richard R. Whitney, 1445 Harrison, Salt Lake City, Utah.
Council Rep. — Dr. John D. Spikes, Dept. Exp. Biology, Univ. of Utah.

The Chapter was fortunate in having two excellent speakers this year, both of whom attracted overflow crowds. Dr. W. P. Cottam of the Botany Department, University of Utah, gave a talk on a field trip which his summer class took last year. The talk was illustrated with many colored slides of photographs which Dr. Cottam took along the way, so that we were able to follow this botanical excursion through Yellowstone Park north to Flathead Lake and the Biological Station there, into Canada west to the coast range and south along the range.

Dr. G. E. Bohart of the Utah State Agricultural College gave an illustrated talk on "Wild Bees at Home."

Dr. Bohart is engaged in research on Legume seed production and the role of bees in pollination of this and other crops. He reported on many aspects of this work including the problem of transplanting bees from one area to another, the number of bees required, and habits of wild bees.

The Chapter held its initiation banquet in the Gold Room of the Newhouse Hotel in Salt Lake City. Dinner was served at 8:30, after which new members were welcomed into the society by toastmaster John Downey. Miss Mary Outzen replied for the new members. A televison show and dancing culminated the evening.

Dr. Elmer G. Berry, a chapter alumnus (Class of 1930), has been appointed head of the American Foundation for Tropical Diseases in Liberia. He had been with the U. S. Public Health Service since 1943. Prior to that he had served on the faculty at the University of Michigan. Dr. Berry left in August for Liberia, where he will take over the directorship of an institute to be set up near Monrovia for the study of tropical diseases.

New Initiates: Norman E. Bishop, H. Richard Bullock, N. Russell Christensen, John E. Craighead, Eddyjo Ekker, Robert W. Grover, Harold Hansen, James T. Husband, Austin G. Johnson, John W. Kliewer, Joseph R. Larsen, Jr., Merlin R. Lee, Jr., George Lefevre, Jr., Mary L. Outzen, Eva A. Rhodes, Frank Salisbury, Grant K. Sanderson, William E. Saul, Yale S. Sedman, Bonnie Jean Slater, Roy Dean Speirs, Gordon A. Stagg, William D. Wardle.

ALPHA MU

—Oregon State College, Corvallis, Oregon

President—Harold Vernon Gallaher, Zoology Dept., Oregon State College.

Vice-Pres.—Clark Alfred Porter, Botany Dept., Oregon State College.

Corr. Sec.—John Richard Parmeter, Jr., Botany Dept., Oregon State College.

Rec. Sec.—John Arthur McGowan, Zoology Dept., Oregon State College.

Treasurer—Charles Edward Warren, Fish and Game Dept., Oregon State College.

Editor—Richard Pimentel, Zoology Dept., Oregon State College.

ALPHA NU

—University of New Mexico, Albuquerque, New Mexico

President—Joseph McKinley, Dept. of Biology, Univ. of New Mexico.

Vice-Pres.—Martin Roeder, Dept. of Biology, Univ. of New Mexico.

Corr. Sec.—Philip Crook, Dept. of Biology, Univ. of New Mexico.

Rec. Sec.—Elizabeth Armstrong, Dept. of Biology, Univ. of New Mexico.

Treasurer—Frank Viquesney, Dept. of Biology, Univ. of New Mexico.

Editor—Kenneth Coburn, Dept. of Biology, Univ. of New Mexico.

ALPHA XI

—University of Rhode Island, Kingston, Rhode Island

President—Thomas Fanning, Alpha Tau Gamma, U. of R. I., Kingston.

Vice President—Rocco Quattrochi, Beta Psi Alpha, U. of R. I., Kingston.

Treasurer—Wayne Durfee, East Farm, U. of R. I., Kingston.

Corr. Sec.—Alice Ann Rose, Alpha Delta Pi, U. of R. I., Kingston.

Rec. Sec.—Marjorie Wetzel, Davis Hall, U. of R. I., Kingston.

Chapter Editor—Edward Goldin, Alpha Epsilon Pi, U. of R. I., Kingston.

At the annual Spring Banquet on May 17, 1950, (founders day for Alpha Xi) the above officers were installed to head Alpha Xi for 1950-1951 academic year. Certainly, wise choices were made as everyone of these officers have turned out to be able persons and have led Phi Sigma to new prestige on the campus of The University of Rhode Island.

This year Alpha Xi Chapter of Phi Sigma Society has become one of the most active organizations on campus. In September of 1950, the society held its annual "Open Forum," primarily directed to acquaint freshman interested in Biology with careers in this field. It was a great success. At Christmas time, Alpha Xi inducted 29 new members to its ranks and a Christmas Party was held at the home of Dr. Zinn, faculty advisor, immediately after the ceremony. Those inducted were:

John G. Alucos '51, Albert Ash '52, Cynthia Bennet '51, William Brey '51, Albert Brooks '51, Walter Brown, Grad., Ralph Caduto, Jr., Barbara Champlin '52, Howard Coleman '51, John Corsetti '51, Jean Cruickshank '51, George Donebec, Jr., '52, Ernest Dufresne, Gloria Giusti '51, Edward S. Goldin '52, Richard Gustafson '51, Richard Guthrie, Jr., '51, William Hart '51, Eleanor P. Johnson '51, Christine Jones '52, John O'Neil '51, Eugene Pelletier '52, Dante Persechino '51, Norma Plante '52, Donald Pokras '52, Alice Ann Rose '52, Margaret Santanielo '51, Irene Turmer '51, Martin Vallow '52.

Alpha Xi, during the past year has as usual taken an active part in bringing speakers well-known in the field of biology to the Campus of The University of Rhode Island. Among them have been: Father Charles Reichart, entomologist, of Providence College, Dr. Wilton M. Krogman, Head of the Anthiopology Department of the University of Pennsylvania School of Medicine, Dr. Paul Burkholder, Botanist and discoverer of Chloromycetin of Yale University, Dr. Nathan Van Dorp Van Vliet, endocrinologist, of the University of Utrecht, Holland, and Dr. Edgar J. Boell, Physiologist and Stirling Professor of Zoology of Yale University, Dr. Alonzo Quinn, Head of the Geology Department of Brown University, and John Hanagan of the U. S. Pure Food and Drug Administration.

However, by far the largest undertaking of Alpha Xi was the conducting of the Twelfth Annual Eastern New England Biological Conference for the University of Rhode Island, its host on April 21, 1951. Sixteen New England Colleges were represented at the Conference during which many original papers and demonstrations were given by both undergraduate and graduate students from these institutions. Taking part were representatives from:

Emannual College, Wellesley College, Wheaton College, American International College, Boston University, Bowdoin College, Tufts College, Regis College, Brown University, Pembroke College, Simmons College Harvard University, Radcliffe College, Boston College, University of New Hampshire (Phi Chapter).

The Principal Address was "Adventures in Conservation," delivered by Dr. Paul B. Sears, author of many articles and books and Head of the New and Unique Conservation Program in the Graduate School of Yale University.

A full day and an eventful program was planned for over 300 participants and visitors. Official welcome to those attending the conference was extended by Thomas Fanning, President of the Alpha Xi Chapter of Phi Sigma, Wayne Durfee, General Chairman of the Conference, and Dr. Harold W. Browning, Dean of the School of Arts and Sciences and Vice President of the University of Rhode Island.

Presenting papers and/or exhibits at the Conference from Alpha Xi were Howard Sanders, Albert Ash, Grace Donnely, Christine Jones, Neil Pellitier, Irene Turner, David Sawyer, William Kielhour, Robert Libby, Andrew Miles, Herbert Frolander, Eugene Bell, Raymond Symkowicz.

It is hoped that we may renew our visit with Phi Chapter at the University of New Hampshire later on this Spring. The exchange of visits for the past two years has been most successful and was thoroughly enjoyed by both groups. Our chapters have collected, "bulled," eaten, and camped together to the great profit of both organizations.

Editor: Please note that we proudly announce a change of address—Alpha Xi is now located at the University of Rhode Island, formerly Rhode Island State College.

Alpha Xi:

Congratulations! Nice to see "Little Rhody" grow up!—Editor.

ALPHA OMICRON —Marquette University, Milwaukee, Wisconsin

President—Howard Suzuki, 1682 N. Marshall St., Milwaukee, Wisconsin.
Vice-Pres.—Floyd E. Morbeck, 2872 N. 19th St., Milwaukee, Wisconsin.
Corr. Sec.—Irene M. Serafin, 1651 N. 27th St., Milwaukee, Wisconsin.
Rec. Sec.—Ann Keefe, 529 N. 13th St., Milwaukee, Wisconsin.
Treasurer—Pauline Tepe, 529 N. 13th St., Milwaukee, Wisconsin.
Editor—James Sinski, 1612 E. Webster Pl., Milwaukee, Wisconsin.
Council Rep.—Dr. E. S. McDonough, Biology Dept., Marquette University.

Our policy is to have a monthly meeting at which we generally have a speaker. This is followed by a business meeting. The program of the chapter that we have set up follows.

October 17, 1950

Dr. Daniel M. Benjamin, forest entomologist of the U.S. Bureau of Entomology and Plant Quarantine spoke on "Ecological Studies of the Red-Headed Pine Sawfly." Dr. Benjamin began his ecological study of the insect in 1947 when large areas of pine plantations in Wisconsin were threatened by the insect. The chief problem has been that of control, he said. Experimental spraying was followed by studies determining the economic significance of control. Through the studies, Benjamin pointed out, attempts have been made to determine the point at which control should be introduced. Kodachrome slides were shown to illustrate the talk.

November 20, 1950

Dr. Kenneth D. Brown of the department of biochemistry, Marquette University spoke on "The Application of Chromatography on Biological Research." Chromatography is a process for determining the component parts of compounds, mixtures, and biological materials, which has only recently come into wide use.

December 19, 1950

The annual Christmas party was held at Hawthorne Glen. Mr. Howard Brossman, supervisor of the Mitchell Park Conservatory in Milwaukee spoke on "Three Dimensional Photography in Mitchell Park Conservatory." At this meeting the following new members were initiated: Joseph De Meio; Arthur Kreitzer, Batavia, Illinois; Joan La Certe, Milwaukee, Wis.; Quentin La Ham, Ripon, Wis.; Kathleen Mc Gowan, Milwaukee, Wis.; Thomas Plouff, Michigan; Dorothy Wood, Milwaukee, Wis.

January 16, 1951

Mr. Albert Fuller, Curator of Botany at the Milwaukee Public Museum spoke on "Recent Trends in Wisconsin Conservation." Mr. Fuller emphasized the preservation of areas in their virgin state for use now for theoretical uses and later, possibly, for practical uses.

February 20, 1951

Dr. Philip Whitford, Assistant Professor of Botany of the Department of Biology, University of Wisconsin in Milwaukee spoke on "Recent Work in Wisconsin Ecology."

March 4, 1951

Dr. Paul A. Weiss gave the annual Phi Sigma lecture on "The Mechanism of Nerve Growth." Dr. Paul Weiss is the director of biological studies and professor of zoology at the University of Chicago. Dr. Weiss told of his method of aiding nerve regrowth consisting of joining the broken ends of a nerve inside a "cuff" made of a live artery. The cuff shuts the regrowing nerve fibers in and keeps scar tissue out. The lecture was followed by a reception.

April 15, 1951

The annual banquet was held. Father Claude Heithaus, S.J., professor of classical archeology, spoke on "Primitive Man." Father Max G. Barnett, S.J., Marquette vice-president, presented a lifetime honorary membership in Phi Sigma to Dr. William N. Steil, Marquette University professor of botany. A botany teacher for the last 40 years, Dr. Steil received the award in recognition of his contributions in the field. Winner of the doctor of philosophy degree at the University of Wisconsin in 1916, he served as a principal of elementary schools and as an instructor in botany at Wisconsin until his appointment to the Marquette staff in 1922. He is former director of the departments of botany and biology at Marquette. The following members were also initiated: Dr. Benjamin, Waukesha; Bryan G. Hoerl, Sheboygan; Edward Kos, Chicago; Ayere Yusa, Chicago; Anne L. Lachowsky, Colorado Springs, Colo.; Archie R. Pequet, Sidnaw, Mich.; David L. Self, Huntington Park, Calif.; Paul Urso, Jr., Brooklyn, N. Y., Francis A. Vasquez, British Honduras; Dorothy Worth, Union City, Ind.; and Alvin L. Thonne, Shorewood; and Richard G. Harrer, and Donna Law, Milwaukee.

April 17, 1951 has been chosen as the date for the annual laboratory demonstration of research work done by members of the society. Those members demonstrating research work are given the opportunity to explain in an informal manner the problems, techniques, and results of their work. Everyone is invited to attend the demonstrations and usually refreshments are served.

May 20, 1951 has been chosen as the date of the annual picnic to be held in Jackson Park, Milwaukee at 2:00 p.m.

The society publishes at irregular intervals a small rexographed paper called the Phi Sigma Newsletter of the Alpha Omicron Chapter. It contains information such as the program for the coming semester, new officers, and notification of important issues to be voted on at the next meeting.

At the present date the Phi Sigma awards have not been announced for the present year. The awards for the school year ending in June of 1950 were presented to Sister Marian Catherine for graduate achievement and to James Sinski for undergraduate achievement. These awards were formally presented at the summer meeting held on July 1, 1950.

ALPHA PI
—University of Colorado, Boulder, Colorado

President—Sven G. Froiland, 2508 Water St., Apt. A, Boulder, Colorado.
Vice-Pres.—Harold J. Grant, Vetsville, Boulder, Colorado, Quonset 336.
Corr. Sec.—Miss Olwen Williams, 765 14th St., Boulder, Colorado.
Rec. Sec.—Miss Monta J. Cook, Univ. Women's Club, Univ. of Colo., Boulder.
Treasurer—Kenneth H. Neldner, 500 Goss St., Boulder, Colorado.

An election of officers is scheduled in the near future and, in addition, we plan to hold an initiation of new members early in May. This year, to date, the following people have become members of Alpha Pi Chapter: Mary Anne Alexander, Joan Ellen Baker, Dr. William S. Creighton, Ketha King, Dr. John W. Marr, Evelyn Norell, William H. Rickard, Willard N. Rosine, Alvin S. Shinn, Janet R. Stein, Tsune Tsuge, David R. Williams.

Our meetings this year have been open to any individuals who might be interested in attending. Among other items of interest were reports from members on trips made to various parts of the world during the summer. Dr. Edna Johnson, a faculty member, reported on her trip to a botanical conference in Sweden. Dwight Milne, Jr., similarly described to the group his experiences of the past summer on St. Lawrence Island in the Bering Sea. In addition to the regular program, preparations for the General Meeting held in Denver and Boulder, December 27-29, were of major concern to the Chapter.

ALPHA RHO
—University of Arkansas, Fayetteville, Arkansas

President—Howard Weinstein, Beta Tau House, Fayetteville, Ark.
Vice-Pres.—James Rasch.
Corr. Sec.—Edward Harms, Fayetteville, Arkansas.
Rec. Sec.—Mary Ann Jacobs.
Treasurer—Carl Koone, Fayetteville, Arkansas.
Editor—Joe Legg, Agronomy Dept., Univ. of Arkansas, Fayetteville.

New Members: Nancy Sue Allen, Jessee W. Anthony, Frank E. Baker, Carl Bonner, Laurin H. Bruckner, Arthur A. Camp, Florence Catto, Howell D. Clinton, Carl Collar, Dallas Dalton, Billy K. Davis, Samuel K. Gooden, Charles T. Griffin, Roy L. Grimsley, George R. Hayes, Jay French Hill, Andrew H. Hulsey, James L. Jones, Howard Kurzner, William R. Lee, Joseph F. Marics. Wayne A. Meyers, Charles W. Nelson, Talmadge S. Nelson, James T. Parsons, Harmon H. Ramey, Jr., James R. Rasch, Byron L. Riggs, Jr., Henry B. Rogers, Albert Robinson, Jr., Clinton B. Rushing, Louis Sander, Jack M. Sloan, Tom Sloan, Marshall R. Thompson, Barry Q. Walker, Charles Weems, and Billy Joe Williams.

Dr. M. C. Kik, who spent several months in Europe last year as a Fulbright Scholar, was the speaker for the meeting in December. He showed two films which depicted the destruction of the lowlands of Holland during the last war and the efforts of the people of that country to reclaim the land. Since Dr. Kik is a native of Holland, he was quite familiar with his subject and made many interesting comments concerning the progress which is being made in rebuilding the cities, dykes, and farmlands of Holland.

Our spring initiation was delayed until April 10, necessitating a delay in naming the new members.

ALPHA UPSILON
—University of California, Los Angeles, Calif.

President—Yost U. Amrein, c/o Zoology Dept., 11027 Strathmore Dr., L. A. 24.
Vice-Pres.—Louis Martin, 1660 Argoyle Ave., Hollywood 28, Calif.
Corr. Sec.—Glory M. Schuyler, 10642 Ashton St., Los Angeles 24, Calif.
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ALPHA PHI —College of Puget Sound, Tacoma, Washington

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Editor—Oivind Gundersen, 3123 N. 9th St., Tacoma, Wash.

The Alpha Phi Chapter has had speakers from both the outside and our own sources. The Chapter meets once a month.

From the outside we have had a speaker from Tacoma Public Health Department that spoke on "Rodent Control." We have also had a joint meeting with the Tacoma Zoological Society.

Three of our own graduate students spoke on their research project for their M.S. degrees:

Howard Irwin spoke on "Botanical Taxonomy" and his work on a new botanical manual for the State of Washington.

Jack Cowan told of his work on the history of Ornithology of the State of Washington and also showed us some specimens from the large collection of bird skins in the College of Puget Sound Museum of Natural History.

Oivind Gundersen spoke on his anatomical study of the brain of the Pacific Lamprey, Entosphenus tridentatus.

On our meeting in March Dr. Gordon D. Alcorn, Professor of Biology, College of Puget Sound, gave a very interesting talk on Fungi.

Among our future speakers we will have Dr. L. H. Snyder, noted geneticist, who will speak at the College of Puget Sound in May, sponsored by the Alpha Phi Chapter.

Of our alumni some are teaching and some are doing graduate work.

These are our new members this year: Richard Carlson, Virgil Comstock, Andrew Drobnack, Corinne Engel, Masaharu Jinguji, Lila Pasnick, Donald Poage, Ronald Poage, Jack Prince, Walter Roth, Marion M. Skaggs, Joseph Snyder.

ALPHA CHI —University of the Philippines,

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Rec. Sec.—Tom Smith, Biology Dept., V.P.I., Blacksburg, Va.

Treasurer—Frank R. Burleson, Box 3075, Va. Tech. Sta.

Editor—Mary E. Smith, 203 Washington St., Blacksburg, Va.

We feel that our greatest achievement of the past year was the establishment of a yearly award of twenty-five dollars ($25.00) for the undergraduate student who has made the best original investigation pertaining to some phase of biology. The recipient does not have to be a member of Phi Sigma.

During the year we have had many interesting speakers. Dr. H. W. Jackson, of the Biology Department, spoke on "Mexico and Mexican Science." This was a report on an exploration of the inland fisheries situation to see if it would be worthwhile for the Rockefeller Foundation to invest in the improvement of fisheries as a food source. From the studies he had made

Dr. Jackson concluded that it would be possible to augment greatly the present activity in inland fishing through intelligent management, and that certain species found there are excellent for the work that can be done. He described life in Mexico, explained many articles he brought from Mexico and showed a series of colored slides illustrating his trip through that country.

Dr. C. F. De La Barre, of the Biology Department, gave a talk on "The Relationship Between Flora and the Surface Features of the Land." Dr. De La Barre brought out the correlation and interrelation between the type of plants found in an area and the water table level of the area, and discussed various factors affecting the water table, such as variation of rainfall, surrounding mountains or valleys, and erosion.

Prof. Seth Gordon, from the Forestry Department, discussed "Current Problems in Forest Research." Problems relating to the economic products and byproducts of the forest, and game management, were discussed, and the methods used in such research described.

Dr. Leonard McFadden, from the Mathematics Department, spoke on "Cybernetics." This was a discussion of the science of Cybernetice, with a description of the "mechanical brain machines." Following the talk he led an open discussion on the subject.

Mr. C. I. Rich, Agronomy Department, discussed "Flame Photometry"—the quantitative analysis of compounds by their spectrum range and intensity when flamed. This method of analysis is important as it is relatively simple to use, is 35-50 times as fast as chemical methods and within 5% accurate.

Dr. W. P. Judkins, Horticulture Department, gave us a "Reappraisal of Education." He stressed the fact that people must *learn* to think individually, and remain students throughout their lives. The talk was followed by a spirited discussion by the Society.

Dr. Fred S. Orcutt, Bacteriology Department, gave a most interesting talk about his trip to Hawaii, illustrated with many beautiful kodachromes and a movie.

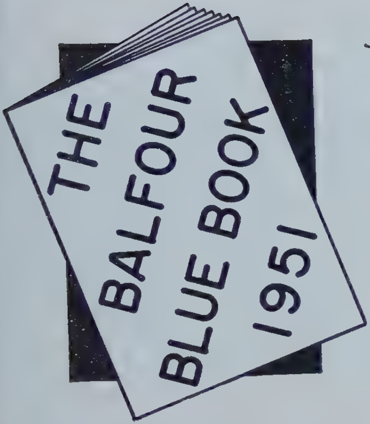
Mr. M. A. Byrd, graduate student in the Wildlife Conservation Department, spoke on his research on the "Economic Importance of the Muskrat in Virginia." This was an interesting and informative lecture on the habits and importance of the animal in this part of the state.

Dr. H. N. Young, Director of the Agricultural Experiment Station, spoke at the Fall Initiation Banquet. Dr. Young presented a thought-provoking talk concerning the place America holds in the world of today and the attitude of Americans toward world events. A very spirited discussion by the Society followed the talk.

Our chief social event is the yearly picnic, an outing for members and their families or dates. The occasion was a real success last year, and plans for this year's picnic are well under way.

Tom Smith, a member of Pi Chapter at Emory University, is doing graduate work at V.P.I. and is an active member of our Chapter. Fred W. Tylic is taking graduate work at Vanderbilt University, and J. M. Adams is doing his Ph.D. research at Oak Ridge, Tenn.

The following people have been initiated during the past year: G. H. Brown, J. T. Buck, G. R. Craddock, J. H. Cross, L. B. Davenport, Jr., A. R. Denton, H. A. Farrar, H. L. Fisher, Jr., J. W. Fisher, Jr., R. G. Fisher, L. S. Hansrote, J. E. Harris, C. A. Hart, S. W. Hastings, E. C. Hatcher, Jr., C. F. Hoover, J. P. Jimenez, A. L. Johansen, R. B. Jones, Jacqueline J. Kelly, D. E. Kincheloe, Jr., L. M. Kline, C. Y. Kramer, M. P. Lacy, L. J. Lancaster, J. H. Markley, R. F. Marshall, M. E. Marvel, J. O. Nicholson, J. R. Price, D. R. Proqulske, T. H. Ripley, C. W. Sanders, A. Sprunt, IV, J. L. Starling, F. N. Swink, Jr., J. P. Thompson, A. R. Slayton, Mrs. Lola S. Smith, J. D. Smith, C. J. Umphlet, M. O. Veliz, B. H. Weddle, Jr., J. E. Wesson, R. S. Westing, Jr., G. R. Williams, J. B. Willson.



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(A member may receive both publications at a special combination rate by adding $3.50 to the annual dues of $6.50.) About one quarter of the membership have become fellows through their scientific contributions and attainments.

The AAAS seeks not only to further cooperation among scientists in all the diverse fields but also it is increasingly concerned with the improvement of human welfare and in a better public understanding of the interrelations of science and human progress. The sections are broad enough to include not only all professionally trained scientists who appreciate the place of science in our contemporary civilization but any person interested in science who wishes to keep informed, and who is concerned with the proper integration of science and human society. With great governmental research agencies on the increase and impending social legislation with scientific aspects, more than ever a strong, unified scientific association, representative of the clearest thinking in science is needed.

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EDITOR: Dr. Anselm M. Keefe, St. Norbert College, West DePere, Wisconsin.

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Of All Active Chapters

BETA—University of Michigan, Ann Arbor, Michigan, founded 3 June 1916.

EPSILON—University of Denver, Denver, Colorado, founded 5 March 1917.

ZETA—University of Wisconsin, Madison, Wisconsin, founded 30 May 1917.

ETA—University of Akron, Akron, Ohio, founded 20 April 1921.

KAPPA—University of Kansas, Lawrence, Kansas, founded 31 May 1921.

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NU—Washington and Jefferson College, Washington, Pennsylvania, founded 11 May 1922.

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UPSILON—Miami University, Oxford, Ohio, founded 7 May 1926.

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CHI—Montana State College, Bozeman, Montana, founded 11 February 1927.

PSI—University of Washington, Seattle, Washington, founded 7 April 1928.

OMEGA—University of Oklahoma, Norman, Oklahoma, founded 24 March 1928.

ALPHA ALPHA—University of Southern California, Los Angeles, California, founded March 1928.

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ALPHA KAPPA—Hunter College, New York City, founded 8 January 1932.

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ALPHA MU—University and State College of Oregon, Eugene-Portland-Corvallis, Oregon, founded 18 November 1933.

ALPHA NU—University of New Mexico, Albuquerque, New Mexico, founded 21 April 1935.

ALPHA XI—Rhode Island State College, Kingston, Rhode Island, founded 17 May 1935.

ALPHA OMICRON — Marquette University, Milwaukee, Wisconsin, founded 18 June 1938.

ALPHA PI—University of Colorado, Boulder, Colorado, founded 24 May 1941.

ALPHA RHO—University of Arkansas, Fayetteville, Arkansas, founded 23 May 1945.

ALPHA SIGMA — University of Texas, Austin, Texas, founded 2, February 1946.

ALPHA UPSILON—University of California at Los Angeles, California, founded 17 May 1947.

ALPHA PHI—College of Puget Sound, Tacoma, Washington, founded 28 February 1948.

ALPHA CHI—University of the Philippines, Manila, Luzon, P. I., founded 12 March 1949.

ALPHA PSI—Virginia Polytechnic Institute, Blacksburg, Va., founded 24 May 1949.

PHI SIGMA
BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although always designated as an honorary biological research society, it should be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts

1915 March 17, Alpha Chapter organized, Ohio State University, Columbus.

1916 May, Central Governing Body organized, BIOLOGIST first issued.

1917 June, last War-time BIOLOGIST issued.

1921 February, BIOLOGIST revived.

1924 December, First National Meeting, Constitution revised, Washington, D. C.

1925 December, Second National Meeting, First Science Program, Kansas City.

1926 December, Third National Meeting, Second Science Program, Philadelphia.

1927 December, Third Science Program, Nashville.

1928 December, Fourth National Meeting, Coat-of-Arms adopted, Fourth Science Program, New York.

1930 January, Council Meeting, Ritual Revised, Norman, Okla.
December, Fifth National Meeting, Fifth Science Program, Cleveland.

1931 Phi Sigma Letters Registered, U. S. Patent Office.

1932 December, Sixth Science Program, Atlantic City.

1933 June, Sixth National Meeting, Seventh Science Program, Chicago.

1935 December, Seventh National Meeting, Eighth Science Program, St. Louis.

1937 December, Eighth National Meeting, Ninth Science Program, Indianapolis.

1939 December, Ninth National Meeting, Tenth Science Program, Silver Anniversary, Ohio State University, Columbus.

1941 December, Tenth National Meeting, Dallas, Texas.

1946 December, Eleventh National Meeting, Boston, Mass.

1948 December, Twelfth Meeting, Eleventh Science Program, Albuquerque, N. Mex.

1949 February, Joins the Association of College Honor Societies.

1950 December, Thirteenth Meeting, Denver and Boulder, Colorado.